INSTALLATION OF GAS MAINS AND SERVICES GD-150

Original Issue Date: 6/1/06 Revision Date: 4/05/12 Status: REVISED

Approved By: John Hill Department: Gas Operations

Reference: CFR Title 49 Parts 192 & 195 (various) Gas Standard: Various

Gas Operations Plan: Natural Gas Plan Sections 6 – 11 & Hazardous Liquid Plan Sections 6-9

Purpose: This specification covers the general requirements for installing gas main and services.

Table of Contents

Introduction

1. GD-150 covers the "general" field requirements for the various facets of installing steel welded protective coated mains, plastic mains, services and associated appurtenances under the contract proposal. For details on a specific subject it is recommended that both the Duke Energy Gas Operations Standards and Procedures are reviewed. They are available on line for review.

2. Shading has been used to show those items considered "significantly" different from the previous version of GD-150.

3. Where provisions of GD-150 differ with the Standard Terms and Conditions, GD-150 shall govern.

4. A complete GD-150 should contain those items listed in the table of contents. If more information is required, please contact Gas Engineering.

5. For those items that deal with price/pricing refer to GD-147.

Section 1
General Conditions

A. Schedule of Work

1. All work shall be performed in conformance with the Purchaser's drawings and specifications. The Purchaser must approve any deviation from the original route.

2. The work may be started anywhere within the limits of the project at the Contractor's discretion; however, the Purchaser reserves the right to direct the application of the work force to any portion of the work.

3. No additional work outside of the original work scope shall be completed unless it is accepted by the authorized agent of Duke Energy. The new Work must comply with the agreed to proposal and all written negotiations.

4. The Contractor shall, upon request, submit a proposed schedule for construction and an installation procedure before beginning the work.

5. The Contractor shall employ overtime at his/her own expense at any time construction fails to meet the specified schedule and conditions.

6. The Contractor shall complete all punch list items within 60 days of being notified.

B. Permits

1. All work shall be in accordance with the requirements and regulations of the public authorities having jurisdiction. The Contractor shall not make street or sidewalk openings unless the Contractor has evidence that a valid permit has been issued for the work. Construction permits will be obtained and paid for by the Purchaser with the exception of "fill" fees that may be required for dump sites.

2. Any permits required for movement of materials or equipment over highways shall be secured and paid for by the Contractor.

3. All railroad crossing permits are applied for by Duke Energy.

   Note: If the Contractor wants to directional drill the crossing, the main typically has to be 10 feet below the tracks. If the change to directional drilling creates a problem with the original permit, the Contractor will not be reimbursed for any down time. It is the contractor's responsibility to notify Duke Energy of their intention to directional drill the crossing and to allow adequate time to obtain a change in the railroad permit. If time does not allow for a change in the permit, the contractor shall be expected to bore the crossing.

C. Employees

1. The Purchaser shall have the right at all times, to require the removal of any supervisor or workman, who in the opinion of the Purchaser performs unsatisfactorily.

2. The Contractor shall ensure that all Federal, State and Local rules/ regulations are satisfactorily met as applicable to the work. This includes, but is not limited to, the Department of Transportation (DOT), DOT Research and Special Program Administration (RSPA) rules/regulations.

D. Training

1. Duke Energy will require polyethylene qualification on all fusion and mechanical connections. Renewal of fusion cards are the responsibility of the contractor. Adequate time must be given by the Contractor to Duke Energy so classes can be scheduled.

2. Duke Energy will require welder certification on all welds performed on Duke's gas facilities. Renewal of welder certification cards are the responsibility of the contractor. Adequate time must be given by the contractor to Duke Energy so welder certifications can be scheduled.

3. Duke Energy will provide training to the Contractor on the renewal of services, installation of meter sets, turn off, turn on and appliance light up. Grounding procedures and a review for sizing services will also be covered in the training.

4. Contractors will be trained for free on Duke Energy policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Only Duke Energy Service Delivery personnel shall handle mercury regulators.

E. Public Relations During Construction

1. The Contractor shall be required to hold weekly on-site meetings with the community representative and/with the Inspector to ensure immediate handling of all customer concerns. The Contractor shall be required to provide the Inspector with a proposed schedule prior to the start of work, along with weekly progress reports.

2. The Contractor shall be required to provide emergency numbers to the dispatcher to assure 24/7 coverage. The Contractor shall also be required to

leave door hangers with business cards, sewer tags and phone numbers for customer contact during and after working hours. A customer notification log must be filled out and returned to the assigned onsite Inspector prior to the start of any construction.

3. Picture ID's are required for all Contractor employees. Contract personnel are required to show their ID when asked by customers or Duke Energy personnel.

4. All primary contractor and sub-contractors vehicles must be clearly marked with either decals or magnetic stickers displaying the company name and phone number while at the work site.

5. Contractor shall respond to customer complaints within 48 hours of being notified by a Duke Energy representative.

6. The Contractor shall conduct his/her work in such a manner, as to minimize damage to sidewalks, roadways, properties, underground utilities, and structures.

7. If a block of sidewalk is to be open for more than 48 hours, class 53 temporary asphalt must be placed into the open section of sidewalk. All tripping hazards are to be avoided in sidewalk areas and, where necessary; foot traffic shall be re-routed where a sidewalk blockage is present.

8. The Contractor shall be responsible for all losses or damages to public or private property including damage to walks, driveways, drain lines, curbs, lawns, shrubs, trees and streets resulting from his/her negligent acts.

9. The Purchaser will settle and pay for all lawn damages caused by the result of the construction; however, it is expected that the Contractor shall conduct his/her work in such a manner as to minimize lawn damage.

10. The Contractor shall assume responsibility for proper surface restoration, and shall indemnify and save harmless the Purchaser from any and all claims, demands, damages, actions, causes of action and defend any and all suits instituted against Purchaser, for property damages or personal injury to agents of the Contractor or third parties, whether caused by negligence attributable to Contractor or not, growing out of restoration or failure to restore.

11. The Contractor shall store and distribute materials and construction equipment in a manner to cause the least inconvenience to the public.

12. Pipe shall be strung in such a manner to satisfy the requirements of public authorities and involved property owners.

13. The Contractor shall be responsible for maintaining the traffic upon private or public roadways, involved within the construction limits of the project using proper signs, barrels, cones, etc.

14. The Contractor shall install and maintain temporary bridges where the trench is:
    a. opened across the street.
    b. crossing a vehicle entrance used for business purposes.
    c. located in front of a fire hydrant.
    d. required by public authorities.

15. The Contractor shall provide and maintain footbridges with guard-railing and toe plates per OSHA guidelines for foot traffic where applicable.

16. The Contractor shall install safety shields to protect the public from injury when breaking concrete or welding/grinding.

17. Plastic rebar safety caps shall be placed on the ends of any vertically placed rebar at all times to prevent injury.

18. Adequate safety measures including caution lights, flagmen, and warning signs, shall be provided and maintained by the Contractor during construction.

19. The Contractor shall, at his/her expense, remove all excess material and debris, resulting from the construction as soon as possible, so as to permit safe passage on the roads and right-of-ways.

20. The Contractor shall provide and maintain sanitary accommodations for the use of his/her employees in a neat and satisfactory condition. The accommodations must comply with the requirements of the public authorities.

21. The Contractor shall cooperate fully with the street contractor, and cause as little interference as possible to the street improvement work.

F. Responsibility for Material

1. The Purchaser will furnish the Contractor, all required valves, fittings, accessories, prefabricated system stations, and patch coating materials, except for pipe, which will be delivered to the job site. The Contractor shall not accept any material from the Purchaser that is found to be defective. The Contractor shall be responsible to account for the material as it is unloaded. The Contractor shall be held responsible for all material that he accepts until the work is completed and accepted. The unloading, loading, and hauling of materials during these operations shall be done with care to avoid damage to the materials, to the highways and structures. There may be occasions when the Contractor shall be required to pick up material at the Purchaser's designated location. Additional movement of the pipe and materials that are to be used in construction, after delivery on the site, shall be the responsibility of the Contractor.

2. Duke Energy will provide all piping and associated pipe materials required for the pipeline work. All 6" diameter and smaller polyethylene pipe will be medium density polyethylene (MDPE), colored yellow. All 8" and 12" polyethylene pipe

will be high density polyethylene (HDPE), colored black with yellow stripes. All steel pipe will be epoxy coated Grade B or stronger. 12" and 16" coated steel pipe will typically have a wall thickness of 0.219" and 0.250", respectively. Duke Energy will specify the grade and wall thickness of all steel pipes on the construction drawings.

3. The contractor shall be responsible for requesting material as it is needed. The contractor must allow a minimum of 21 days for pipe deliveries on pipe sizes less than 8". For pipes 8" and larger, a minimum of 42 days will be required. It shall be the responsibility of the Contractor to unload material at the jobsite and to provide weekly reports showing material received, material used and material remaining. The material assigned to a module is to be used on that module only. At the end of the project, all surplus materials are to be returned to the storeroom or a credit requisition completed allocating the material to another job. The material must be returned or requisitioned to another job in the same condition that it was received. A 10 % overrun in the quantity of pipe will be allowed for waste. All other unaccounted, damaged or material left unprotected shall be the responsibility of the Contractor.

4. Service material will be delivered to each Contractor's storage yard. Each Contractor shall be required to provide an adequate shelter area with shelves to organize all the service material. The Contractor shall provide a person to receive material, organize, and reorder material as needed. The Contractor shall accept responsibility to ensure the reorder is completed as necessary and the faxing of appropriate paperwork to 513-629-5822. At the end of each calendar year, the Contractor shall be required to inventory all service related material including material at job sites and truck inventory.

5. The Contractor must notify the Inspector of the exact location where the pipe is to be delivered. It shall be the Contractor's responsibility to determine where the staging location for the new pipe is to be. The Contractor shall have personnel available to unload the pipe when the delivery truck arrives.

6. The Contractor shall be responsible for the adequacy of supplies and materials necessary for doing the work without requiring revisions and causing delays.

7. The Contractor shall be responsible to separate material by job and shall not use material on a project unless it is specifically designated or is properly requisitioned from another project

8. The Contractor shall return all excess material, except pipe, upon completion of the work to the Purchaser's storage facility.

9. The Contractor shall be responsible for packaging all excess material and having manpower and equipment available to load this material onto the Purchaser's trucks. There may be occasions when the Contractor may need to return material to the Purchaser's designated location.

10. Contractor Supplied Materials:
    a. The Gas Contractor is required to provide all materials and equipment other than as indicated on the construction drawings, which is necessary to construct the project.
    b. Spray paint used by the contractor for markings must be water soluble and capable of being removed if needed.
    c. All welding materials such as welding rods, grinding wheels, clamps, etc is to be provided by the Contractor.

G. Fences

1. Fences shall be repaired at the Contractor's expense, and to the satisfaction of the property owner. Damage claims arising from livestock wandering through open or temporarily repaired fences shall be paid for by the Contractor.

H. Crop Damages

1. The Purchaser will settle and pay for all crop damages necessary for the main installation; however, it is expected that the Contractor shall conduct his/her work in such a manner as to minimize crop damage.

I. Right-of-Ways

1. On private property, the Purchaser will furnish a right-of-way, including the right of ingress and egress, and the right to use the grantor's adjacent land for construction of the main within the specified limits. The Purchaser will note any and all restrictive clauses contained in the right-of-way agreements on the construction drawings, bids, or on a separate letter. The Contractor shall conduct his/her operations in accordance with such agreements.

2. When construction involves the use of the Purchaser's easements, the Contractor shall contact each property owner, prior to entering the property. The Contractor shall be responsible for damages to and restoration of driveways and temporary roadways used for the ingress and egress.

3. The Contractor shall clear the right-of-way to such a width as required by the Purchaser and in such a manner as to permit his/her ability to work satisfactorily. Excessive damage to the land must be avoided. Brush and timber taken from the right-of-way shall be disposed of by the Contractor to the property owner's/responsible party's satisfaction.

Section 2

Prior to Construction

Section 2: Prior to Construction

A. Preliminary Work

1. The Purchaser will furnish a field Inspector for each job. The Inspector will be responsible for obtaining all necessary field measurements and notes on the installation drawing. The Contractor shall cooperate with Purchaser's field Inspector in the prosecution of the work and obtaining the necessary records.

2. Duke Energy recommends that the Contractor videotape every project prior to starting construction. This video record can be extremely important in settling disputes with governing agencies and customers. If the project is not videoed and there is a dispute between the contractor and the customer, Duke Energy will side with the customer. When videoing, addresses must be indicated verbally or pictorially.

3. The Inspector will order all material required for the job. The Contractor must provide a reasonable amount of advanced notice to allow the Inspector time to have the material ready for delivery.

4. Stockpiling of pipe on the site shall be in accordance with Gas Standards 2.1.4 Coated Steel Pipe Unloading, Storage and Hauling and 2.16.20 Receiving, Handing and Storage of Polyethylene Pipe, Tubing and Fittings.

5. The Contractor shall have the underground utility locations marked on the streets, curbs, as required by House Bill and the Purchaser's Inspector. The Purchaser assumes no responsibility for miss-marked utilities or downtime as a result of late or incorrect marks.

6. The Contractor, together with Purchaser's representative, shall notify each property owner prior to working on, near or around the owner's property. They shall explain the nature of the work to be done, and make arrangements as necessary to minimize any inconvenience to the owner as the work progresses. Where fences, shrubbery, mailboxes, etc. are involved, there must be an agreement with the owner as to the location at which these private appurtenances are to be reinstalled. This reinstallation shall be at the Contractor's expense.

B. Surface and Subsurface Conditions

1. Because gas is usually one of the first utilities to begin work on a street improvement project, it can be assumed that trees/brush will not be cleared as indicated on the construction prints. Those incidental trees or brush that require removal for gas main installation, shall be removed by the Contractor. The cost to remove the trees/brush must be included in the "pipe installation" cost.

2. The Contractor shall be responsible for all tree damage unless directed by the Purchaser to perform work that could be detrimental to the trees. The Contractor is

responsible for notifying the Purchaser of potential detriment to the trees "prior" to excavation. Otherwise, the Contractor assumes responsibility for damages.

3. The Purchaser assumes no responsibility and gives no guarantee as to what subsurface conditions will be found to exist when the work is being carried out. Locations of underground structures as shown on Purchaser's drawings are approximate only. Test holes must be dug prior to saw cutting the street to insure underground structures will not create problems with construction.

C. SEWER LOCATION AND BREECH PREVENTION

1. See Section 10 of this procedure.

Section 3
Excavation

A. Route Sequence and Installation

1. Prompt restoration of any interrupted gas, water, or other utility service is mandatory.

   Note: The Contractor is not to repair any active gas services or gas mains that may be damaged during construction. If the Contractor encounters any leaks or suspects a potentially dangerous condition, the Duke Energy emergency contact number and the Duke Energy project inspector must be notified immediately

2. The Contractor is to maintain a minimum protected work area. All unattended open cuts in sod must be covered with ¾" plywood and barricaded with appropriate flashers, barrels, or other proper equipment. Stakes alone will not be acceptable.

3. The crossing of railroads, bridges, and streets shall be made in such a manner that will meet the specifications and requirements of the authorities having proper jurisdiction over such crossings.

4. The trench for the main shall have a maximum width as shown in {*Gas Standard 2.14.1: Typical Restoration Backfill*}. Restoration costs will be determined based on these dimensions.

5. A minimum amount of pavement shall be removed in order to reduce the amount of restoration. Suitable equipment and methods shall be used for cutting the edges of the pavement so as not to disturb or damage the pavement or base to be salvaged.

6. The pavement shall only be removed a reasonable distance in advance of excavation, to avoid inconvenience to the public. However, it is recommended that test holes be dug enough in advance to reduce the possibility of potential unforeseen conflicts with other underground utilities.

7. The trench shall be dug so that a minimum number of vertical bends are required.

8. The trench shall be excavated to a depth to permit the necessary cover as shown on the "issued" drawing, as measured from the top of the pipe in the trench, to the average level of ground on the two sides of the trench. If the depth is not shown on the drawing, it must be assumed that a cover of 3 feet will be utilized or as directed by governing agency .Refer to Appendix 3-A "State of Kentucky Requirements".

   Except as provided in paragraphs a through c below, all Transmission and F/L mains shall have a minimum cover of 36 inches.

   a. Where main is installed in consolidated rock the minimum cover shall be 24 inches.

b. Where an underground structure prevents installation of a transmission or F\L main with minimum cover, the transmission or F\L main may be installed with less cover if it is provided with additional protection to withstand anticipated external loads.

c. All pipes installed in a navigable river or stream shall have a minimum cover of 48 inches in soil or 24 inches in consolidated rock. However, less than minimum cover is permitted in accordance with paragraph(c) of this subsection.

For further details, reference Kentucky Administrative Regulation 807 Part 5.022 and DOT CFR Title 49, Minimum Federal Safety Standards, Part 192.327.

9. If the Purchaser's Inspector deems it prudent, the depth of cover may be reduced or increased on street improvements with the approval from the Design Engineer.

10. Whenever the bottom of the trench has been excavated below the proposed elevation, the correct amount of **compacted** materials must be placed in the bottom of the ditch to provide the proper elevation.

11. The Contractor shall be responsible for damage resulting from failure to locate other underground utilities and structures prior to excavating, within House Bill guidelines.

12. The trench shall be cut so as to permit the main to pass under other utilities, drainage tiles, and other structures, where the minimum cover as specified is not available by going over such structures. A minimum clearance of *twelve* (12) inches between the main and other structures shall be maintained if main is located under hard pavement, six (6) inches if in sod. Where the minimum clearance between the gas main and other structures cannot be obtained, insulating spacers of an approved type, provided by the Purchaser, shall be used between the main and other structure to prevent cathodic issues. Joint trench requirements differ from this procedure. {*Gas Standard 2.18.3 : Joint Electric, Gas, Telephone and CATV Installation*}

13. The Contractor shall be entitled to additional payment if an offset is required to avoid an unforeseen obstacle, either in the vertical or horizontal direction. One offset will be defined as the use of two (2) unplanned elbows.

14. Should the Contractor be required to excavate the trench to a depth greater than five (5) feet and two (2) feet greater than the planned depth as a result of non-contemplated obstructions (culverts, water main, etc.), a payment for "extra depth" will be considered.

15. The Purchaser assumes no responsibility for estimating the quantity or the type of rock excavation that may be encountered. Only limestone and other hard-stratified material in a continuous volume of at least one cubic yard will be reported as rock excavation. One continuous cubic yard is not intended to mean a specific length,

width, or thickness, but a combination of these three dimensions that yield a cubic yard. Length x width x thickness is equal to more than one cubic yard or 27 cubic feet.

Note: The thickness of the rock must be greater than 6" for the entire length in question in order to receive payment for rock excavation.

16. In order to eliminate potential problems for payment of rock excavation, the width of the trench must be agreed upon between the Contractor and the Duke Inspector. The two must agree to the amount of rock, by measuring the rock located in the sides of the ditch. The actual amount of rock must be agreed upon between the Purchaser and the Contractor prior to backfilling the ditch.

17. The trench bottom shall be smooth and free from rocks, debris and/or protrusions that may damage the pipe or coating.

18. Bank run maybe required for use as padding. Padding is defined as bank run placed below and above the pipe and will be used in soils unsuitable for backfill. The Inspector will determine the use of padding. Approved bank run will be a separate pay item and will be paid by the ton.

19. Bank run gravel used for padding shall be per ODOT 703.11 Ohio Type 2 as listed in ODOT's "Construction Material Specification" (current edition) or clean washed sand.

20. Prior to laying the pipe in trenches where imbedded rock is present, the Contractor shall be required to pad the trench bottom with a minimum of three (3) inches of finely compacted material, and/or install rock shield on the pipe, as directed by the Purchaser. {*Gas Standard 2.14.1: Typical Restoration Backfill*}

21. There will be times it will be necessary to lower an existing, in service gas main. The Purchaser's Engineering Department will provide the necessary information to lower the main in a safe manner. The procedure must be followed to ensure that no excessive stresses are created on the gas main.

B. Bracing

1. The Contractor must support the sides of the trench as necessary to prevent excessive damage to the sides of the pavement and creating an undermining situation. If excessive damage to the pavement occurs, the Contractor shall perform, at his/her expense, such restoration as shall be required by the Purchaser or public authorities having jurisdiction. The Inspector shall indicate these areas on the daily work sheets. {*Gas Standard Section 12: Excavations – Shoring Manual*}

2. Bracing open trenches shall be required when:
   a. Increased cover is necessary

b. Changes in water and moisture conditions are observed
c. Noticeable cracks adjacent to the ditch or within the roadway pavement
d. Noticeable cracking bottom heave
e. Trench wall deformation
f. Surface settlement.
g. Or as defined in the OSHA requirements.

3. Particular attention must be given to the following:
   a. Placement and removal of support system and excavated materials.
   b. Load changes in the bracing.
   c. Physical condition of the bracing.

4. If seepage of water into the trench occurs during excavation, the following steps are to be taken:
   a. Brace the trench walls.
   b. Limit the length of the excavation to short sections and do not allow the trench to remain open overnight.
   c. Provide a drainage system along the pipeline with a proper outlet, where possible.
   d. Provide proper compaction of the ditch per the specifications listed in Section 7 "Back-fill".

C. Installation at Specified Elevations

1. A surveyor's level and rod are required and must be supplied by the Contractor on projects that specify elevations for the top of the gas main.

2. The Contractor is responsible for reading the levels and installing the pipe according to the Purchaser's survey points.

3. The Purchaser will set points on the project to be used by the Contractor to determine how deep to install the main. The Contractor should notify the Purchaser at least 10 working days prior to starting the project, so that the points can be set. If set points are disturbed, the Contractor should notify the onsite Inspector immediately so that they can be reset.

4. The points typically are marked with a "C" which indicates a cut to the top of the pipe from the set point.

5. When using an offset, the cut is normally indicated on the offset stake and must be transferred to the centerline to determine proper elevation for the top of pipe.

6. A decimal measurement such as C 3.8 should be converted to feet and inches or use a decimal tape measure/decimal survey rod.

7. To convert decimal feet to inches, multiply the decimal by 12 inches. (Example: .8' = 0.8 x 12" = 10")

   To determine how deep to dig the trench add the pipe diameter and depth of padding to the cut that is marked. For example if set point says C 3.5' and 6" pipe with 6" sand padding is being used, the ditch should be cut to a point 4.5' below the set point. (C = 3.5', pipe = 0.5', padding = 0.5'; 3.5' + 0.5' + 0.5' = 4.5')

   Note: The ditch should be 4.5' below the set point. A surveyor's level should be used if the set point is not on the center line.

8. Services (both main to curb and curb to meter) should be installed at the same ELEVATION as the main on street improvement projects unless the cross sections sheets show a potential conflict. Contact Purchaser's Inspector or Gas Engineering if in doubt.

APPENDIX "3-A"

STATE OF KENTUCKY UNDERGROUND UTILITIES DEPTH REQUIREMENTS

KENTUCKY TRANSPORTATION CABINET
FRANKFORT, KENTUCKY 40622
WWW.KENTUCKY.GOV

ERNIE FLETCHER
GOVERNOR

MAXWELL C. BAILEY

RECEIVED
NOV 4 2004

MEMORANDUM

TO: Chief District Engineers
District Permits Personnel
District Utilities Personnel

THRU: Maxwell C. Bailey
Secretary

Marc Williams
Commissioner of Highways

J.M. Yowell
State Highway Engineer

Charles A. Knowles
Executive Director of Traffic Operations & Maintenance

Tom Schomaker
Director of Maintenance

FROM: M. Chad LaRue
Branch Manager of Permits

DATE: October 27, 2004

SUBJECT: **Revision to Permits Policy Manual-Utility Crossings-Change to Underground Utilities Depth Requirements**

This memorandum is to notify all Kentucky Transportation Cabinet personnel of the change to the required depth for underground utilities that are located on state right-of-way. This change is being done to reduce the potential for impacting underground utilities that are located on state right-of-way. The previous policy had a variance that led to inconsistency in the depth at which underground utilities have been installed throughout the state. In addition, there have been instances where sign post installation, guardrail installation, and ditching have damaged underground utilities.

Effective the date of this memorandum, section PE 202-2, page 2 of 3, under Utilities in segment Underground, in the Permits Policy Manual shall now read, "The minimum depth for underground utilities is 42" under roadways, ramps, and ditch lines and 30" in all other areas within state right-of-way. Exceptions may be made only where the terrain is such that this requirement is proved to be impractical and where a lesser depth will not interfere with highway maintenance, safety or aesthetics. It is at the discretion of the Chief District Engineer to determine where these exceptions are to be allowed."

Section PE-202-3, page 1 of 5, in the segment Underground Utilities Installed Longitudinally, shall now read, "Requirements- These utilities must be buried a minimum of 30 inches deep..." The remaining portion of this segment shall remain the same.

Section PE-202-3, page 3 of 5, under Encasement of Utilities, in the segment Conditions Where Encasement Not Required, shall now read, "3. Pipe crossings 2" in diameter and under will not require encasement provided they are buried at least 42" below bottom of ditches, shoulders, and roadway surfaces." I have also attached an updated form TC 99-10 that reflects the above change.

This policy change will be made in the Permits Policy Manual upon its next revision.

MCL

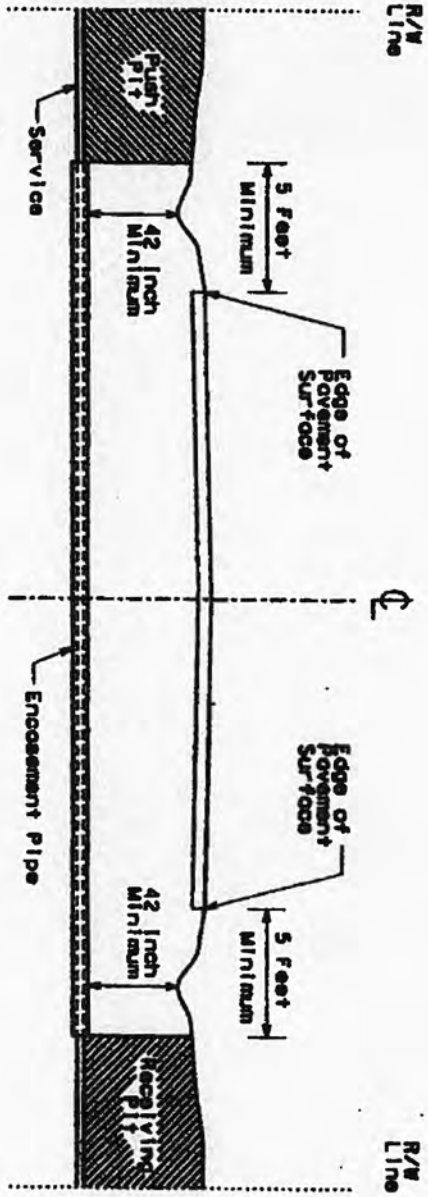
C: Central Office Division Directors

Attachment

Kentucky Transportation Cabinet
Department of Highways
Permits Branch

EXHIBIT 8
TC 99-10
Rev. 9/2004

TYPICAL HIGHWAY BORING CROSSING DETAIL



Permit No. _____
Route No. _____
Pavement Width _____

1. Push Pit and Receiving Pit shall be backfilled and thoroughly compacted.
2. All ditch lines are to remain open at all times.
3. Seed and straw all disturbed areas immediately after completing the work.
4. Provide traffic control as required to insure the safety of the traveling public in accordance with the current edition of the "Manual on Uniform Traffic Control Devices".

ALL SERVICES OVER 2" IN DIAMETER SHALL REQUIRE ENCASEMENT.

Section 4

Installation of Steel Pipe

Section 4: Installation of Steel Pipe

This specification covers the General Conditions and Technical Requirements for the storage, handling, welding and installation of steel gas mains and their associated appurtenances under contract proposal or by using Company construction forces.

A. Handling of Steel Pipe

1. Care shall be exercised during all phases of pipe handling to minimize damage to the coating as well as the beveled pipe ends.

2. If the Contractor must move the pipe, the pipe shall be loaded and secured so as to prevent undue shifting and/or flexing during transit. Stakes and chains shall be padded to prevent damage to the coating.

3. Coated pipe shall be handled with wide, non-abrasive canvas, rubber composition leather, or nylon slings. Minimum sling loads shall be as follows per 40' length of pipe:

Pipe Size	Min. Strength Rating
12" an under	2500#
14" – 20"	5500#
24" and over	9000#

4. Slings of proper width and smoothness, as approved by the Purchaser, shall be used to prevent injury to the coating. Any slings showing signs of damage or fraying shall not be used.

5. Slings shall contain no bolts or rivets, which can come into contact with the coating. Wire rope, chains, hooks and bare cables shall not be used, except those hooks that may be used on the uncoated ends of single pipe lengths for loading and unloading purposes.

6. Skids used for supporting the coated pipe shall be free of nails or embedded rocks to insure the pipe coating is not damaged. Skids must have enough strength to safely hold the pipe in position.

B. Stringing Pipe

1. Stringing pipe shall be performed in a manner such that will not damage the ends of the pipe or the protective coating.

C. Welding

1. The joining of the steel pipe and components shall be done in accordance with the Purchaser's Qualified Welding Procedures. The following are not all inclusive but the most common procedures used:

   a. Specification No. 501-2 Standard Welding Procedure SA-II-A-II: For Steel Pipe with O.D. from 2 3/8" to, and including 12 ¾ " and wall thickness 0.188", up to, but not including 0.250"

   b. *Specification No. 501-3 Standard Welding* Procedure SA-III-A-III: For Steel Pipe with O.D. greater than 12 ¾ "and wall thickness 0.250", up to, but not including 0.344"

   c. Specification No 501-20 Standard welding procedure SA-F1-A-V: for fillet welds on steel pipe for socket –weld couplings, slip-on flanges, and full encirclement welding sleeves.

2. No person shall be permitted to weld steel pipe unless they have been tested and qualified in accordance with Section 6 of API Standard 1104 (20th Edition) under the observation of a qualified Duke Energy welding supervisor. Each welder must have in his possession an up-to-date certification card. All testing will be at the Contractor's expense.

3. The contractor must have a copy of the welding specifications onsite for all steel pipeline projects, if the contractor does not have a copy, then one should be requested. F/L projects will have the welding specifications noted on the cover sheet of issued construction drawing. Contractor can question the specification if they are not in agreement with the required process.

4. Typically, pipe furnished shall be steel pipe API X-42, Sizes 1 ¼", 2", 3", 4", 6", 8", 12", 16", 20", 24" and 30" unless otherwise specified. All pipe furnished will be double-random lengths (36'-41') mill coated with the ends beveled for welding. Fittings are Grade B unless specified otherwise. *{Std. 2.1.2 : Coated Steel Pipe Inventory}*

5. The Contractor shall be required to provide all welding materials, such as correct welding rods, grinding wheels, clamps, etc. as well as other incidental materials and equipment necessary to construct the project.

6. Immediately prior to joining the pipe, each joint shall be visually inspected and, when required or specified, brushed out internally by a method approved by the Purchaser. The Contractor shall take positive measures to ensure that no foreign matter is sealed inside the main. Longitudinally welded pipe shall be joined with

the welds staggered and located in the top segment of the pipe. The open ends of sections shall be closed by means of dead caps when no work is taking place on the main.

7. Production joints selected by the Purchaser that are removed from the line and found to be defective shall be replaced by the Contractor at the Contractor's expense. Welding the replacement back into the line shall be administered as if it was a test joint.

8. A qualified visual welding Inspector shall visually inspect all welds.

9. Miter joints shall not be permitted.

10. Guidelines for Interpretation and Application of API 1104.

Pipe that meets the requirements of more than one pipe grade (i.e., pipe that is 'multi-graded' or 'dual or triple stenciled'), it is not necessary to use a welding procedure that is qualified for the highest grade to which the pipe is certified.
It is only necessary to use a welding procedure qualified for use on the grade for which the material will be used. For example, for pipe certified to both API 5L X42 and X52, a welding procedure qualified for use on X42 is acceptable provided that the material is being used as X42. However, for some applications (e.g., high longitudinal strains), it is good practice to at least match the actual yield strength
of the pipe. The use of filler metal with yield strength that matches or overmatches the actual yield strength of the pipe material prevents longitudinal strains from accumulating in the weld region, which is more likely to contain imperfections than the pipe material.

D. Valves and Other Appurtenances

1. The Purchaser reserves the right to add valves and accessories not shown on the drawings. Payment will be the bid price if available; otherwise, a change order will be required.

2. The Contractor must defer the installation of line valves until after the strength test has been successfully completed, if applicable, unless specified by the Purchaser.

3. Valves to be welded into the line shall be installed in the closed position. The valve is to be opened when complete.

4. Valve installation shall include valve, pressure stems, blow offs and valve box. *{Gas Standards 2.6.2 : Valve Installation - and 2.6.2.1: Steel Main Pressure Stem Installation}*

5. The application of cathodic protection materials and/or repairing of the coating, next to the valve, shall be included as part of the installation of the valve.

E. Direct Bury

1. The main shall be laid to the established grade with the pipe resting directly on the bottom of the trench or undisturbed soil.

2. The Contractor shall lower the main into the trench in such a fashion as not to cause any distortion or damage to the pipe, or coating. There may be some applications where the rock is so prevalent that the rock shield may have to be placed on the main prior to lowering.

3. The rock shield shall be bent to fit the curvature of the external surface of the coated pipe, and shall be secured to the pipe in such a manner as to prevent loosening or shifting during lowering-in or backfilling operations.

4. All trenches shall be visually inspected for sewer or septic facility damage. Visual inspection shall include examining both the trench and spoil for evidence of damage to sewer and septic facilities.

5. The Contractor shall remove liquids from the bottom of the trench before the main is lowered. Precautions shall be taken to prevent floating of the main, water draining into the main, and the caving of trenches.

7. In the event of excessive rainfall or subsequent bad working conditions, the Purchaser may require the Contractor to postpone operations until such time as the work can progress without excessive property damage.

6. Walking or standing on the coated pipe shall **not** be permitted.

F. Boring

1. The Contractor shall provide all necessary equipment to bore roadways and/or driveways in accordance with the Purchaser's construction drawings and specifications.

2. Where boring has been specified on the construction plans, boring will be the expected method of installation. The contractor must receive prior written approval from Gas Engineering if directional drilling is to be used in place of boring.

3. Driving of pipe will not be permitted.

4. A section of pipe will be brought beyond the exit hole and investigated for possible damage.

5. Jacking may be permitted with the agreement of the Design Engineer. All damaged main must be removed and must not be used. Any damaged coating must be

repaired before acceptance. The Purchaser assumes no responsibility for failed attempts.

6. "Boring-With Casing" includes all excavation, hand or otherwise, required for placing the casing inside the bore including the bore pit. The bore is to be installed per design at the designated depth. The new casing must be positioned in such a fashion that no additional fittings will be required on the new main and that there will be no undue stress placed on the new main when installed. All casing joints must be welded per Duke Energy's welding standards to prevent water from entering the casing.

7. "Boring-With Casing" shall include the installation of all insulators, seals, and vents, if required. *{Gas Standard 2.12.1: New Steel Pipeline Cased Crossings for Railroad and Highway Crossings.}*

8. Tunneling shall be done only upon agreement with the Purchaser. Tunneling must be performed in a manner as specified by the Purchaser or public authorities. The Contractor shall provide all adequate shoring for trenches and boxing for tunnels where necessary upon agreement with the Purchaser. The Contractor must have a competent person on site to ensure OSHA Shoring Regulations are being followed.

9. The borehole size must be at least the next pipe diameter larger than the pipe size being installed.

10. The borehole will not be used any time that the bore causes the pavement to hump.

11. All bores shall be installed per depth listed on the "issued" drawing. If the depth is not listed, it must be assumed that a cover of 3 feet will be required.

12. All bores must be installed within +/- 1 foot horizontally of the designed location unless specifically authorized in writing by the Purchaser.

13. Before a main/casing is installed by boring, the location and depth of all existing utilities and sewer laterals must be determined. A plan showing the location of existing sewer laterals must be submitted to the Purchaser and approved prior to the Contractor performing the bore. Acceptable methods for locating the existing sewer laterals are a camera/sonde or by physically uncovering the lateral.

G. Horizontal Directional Drilling (HDD)

1. Because the HDD of steel main is typically done to cross bodies of water, the necessity to dig pot hole is lessened; however the location of neighboring utilities must be taken into consideration when deciding on the new gas main's alignment.

2. Gas Engineering must be notified before any attempts are made to HDD a steel main that was **not** considered in the original design.

3. The main used in the HDD must be coated with an adequate thickness of Powerecrete, or equivalent, to minimize the potential destruction of the protective coating. *{Gas Std. 2.1.2: Coated Steel Pipe Inventory}*

4. The minimum bending radius of the proposed main, as determined by Gas Engineering, must not be exceeded.

H. Field Bending

1. The Contractor shall make all necessary field bends by means of a bending machine with the appropriate mandrels and shoes to create a smooth bent pipe free of any mechanical damage, per Pipeline Safety Regulations 192.313.

   a) Each field bend in steel pipe, other than a wrinkle bend made in accordance with §192.315, must comply with the following:

      (1) A bend must not impair the serviceability of the pipe.

      (2) Each bend must have a smooth contour and be free from buckling, cracks, or any other mechanical damage.

      (3) On pipe containing a longitudinal weld, the longitudinal weld must be as near as practicable to the neutral axis of the bend unless:

         (i) The bend is made with an internal bending mandrel; or

         (ii) The pipe is 12 inches (305 millimeters) or less in outside diameter or has a diameter to wall thickness ratio less than 70.

   (b) Each circumferential weld of steel pipe which is located where the stress during bending causes a permanent deformation in the pipe must be nondestructively tested either before or after the bending process.

   (c) Wrought-steel welding elbows and transverse segments of these elbows may not be used for changes in direction on steel pipe that is 2 inches (51 millimeters) or more in diameter unless the arc length, as measured along the crotch, is at least 1 inch (25 millimeters).

   Pre-formed welding elbows, provided by Purchaser, will also be accepted.

2. Adjustments to the ditch are not acceptable to eliminate a planned field bend.

3. Wrinkle bends shall not be permitted, (Pipeline Safety Regulations 192.315). The cost for the replacement of damaged pipe, as a result of improper bending, will be charged to the Contractor.

4. A bend must not impair the serviceability of the pipe.

5. On pipe containing a longitudinal weld, the weld must be as near as practicable to the neutral axis of the bend unless:

   a. The bend is made with an internal bending mandrel.
   b. The pipe is 12-inches or less in outside diameter, or has a diameter to wall thickness ratio less than 70.

6. Cold bent pipe sections shall not include a circumferential weld, unless the weld is subject to radiographic examination after bending.

I. Pipe Defects

1. Should pipe defects be discovered such as sharp or deep gouges and dents and/or mill defects, they will evaluated and a repair option selected for the pipe body gouge and/or mill defect.

   CAUTION: Defects such as sharp or deep gouges and dents may have cracked during service and need to be handled with caution. Lowering the pressure is recommended when evaluating and repairing.

   Reference Procedure GD70.06.019 Pipeline Defect Evaluation and Repair

Section 5
Cathodic Protection

The cathodic protection system shall be installed as indicated on the construction prints. The cathodic protection system installation is one of the most important aspects of the steel gas main installation because of the critical corrosion protection it provides to the gas mains.

A. Anode Installation

1. Magnesium Anodes (Sacrificial Anodes) shall be installed at the location or spaced center-to-center as indicated on the construction prints or Duke Energy Inspector. It is important to understand that when SWPC pipe is installed sacrificial anodes are a mandatory requirement unless a rectifier system is present. *{Gas Std. 7.5.3 : Magnesium Anode (3# to 50#) Installation for New or Existing Steel Gas Pipelines}*

Note: Under no circumstances shall magnesium anodes be installed within 2 feet of a weld joint.

B. Insulating Joints

1. The Corrosion Engineer will determine the location of all insulated joints.

2. All insulating materials shall be cleaned and dried thoroughly before installation. Extreme care shall be exercised to insure that no electrical conducting path exists between the mating flanges.

3. The flange insulation shall be installed as shown on *{Gas Std. 7.6.2: Flanged Insulating Joint for Flat Face or Raised Face Flanges}*

4. Compression type insulating couplings shall be installed in accordance with the manufacturer's recommendations. Pipe ends and gaskets shall be thoroughly cleaned and dried. After installation, a thorough coating of pipe coating material, compatible with that on the adjacent pipe shall be used to protect the couplings.

5. Immediately after installation of each insulating joint, the completed joint shall be tested by a method approved by the Corrosion Engineer to ensure that no current conducting path exists across the joint.

6. The Contractor shall install a cathodic test wire on each side of the insulating joint that is to be buried. Test wires shall terminate inside the valve box or cathodic terminal box, whichever, is indicated in the construction drawings.

C. Coupling Bonds

1. Electrical shunts, known as coupling bonds, shall be installed across each compression type coupling except when armored or insulating gaskets are used to make up the joint.

2. Coupling bonds shall be formed by the Contractor from insulated copper wire. Connections to the pipe shall be made by thermite welding. *{Gas Std. 7.7.13: Cathodic Protection Bonding of Coupling}*

3. After installation of the bond, the entire bond assembly shall be given two coats of an approved pipe coating for protection against galvanic action.

D. Test Connection Installations

1. The Contractor shall install test connections in accordance with *{Gas Std. 7.7.1: Cathodic Protection Test Box Locations}* at locations specified on the construction drawings or as indicated by the Purchaser's Inspector. The Design Engineer may specify that the loose end of the wire be placed in an existing valve or syphon box, in place of a separate box.

2. The cathodic protection test station shall be installed at the locations indicated on construction prints. It is important to understand that when SWPC pipe is installed, test stations/connections are a mandatory requirement with no exceptions. The following type of test stations/connections shall be installed in accordance with the following Duke Energy Gas Standards:

   a) *{Gas Std. 7.7.2: Test Connection For Pipeline Crossings}*
   b) *{Gas Standard 7.7.4.1: Above Grade Test Station For Transmission & Distribution Mains}*
   c) *{Gas Standard 7.7.4.2: Grade Level in Sod Test Station for Transmission & Distribution Mains}*
   d) *{Gas Std. 7.7.4.3: Hard Paved Grade Test Station for Transmission & Distribution Mains}*

   Note: Under no circumstances shall test station/connection be installed within 2 feet of a weld joint.

3. It is very important that the cad weld connection for test stations or magnesium anodes be coated. If the coating is not installed properly, the coating will disbond and create a cathodic shielding condition. The cathodic protection current is unable to penetrate the disbonded coating and corrosion shall take place even if the anode is within 3 feet of the location. It is important to follow the manufacturer's surface preparation recommendation. Surface preparation is one of the most important factors in obtaining a great coating job.

4. The cad weld connections shall be coated in accordance with *{Gas Std. 7.8.3: Installation of Handy Cap for Coating Cad Weld Connections}*

E. Coating Inspection

1. The Contractor shall furnish an approved electronic holiday detector (Jeep) for the purpose of locating defects in the pipe coating. All coating defects will be marked, repairs made and retested by the Contractor prior to lowering pipe into ditch. *{Gas Std. 7.7.12: Mill Coated Pipe - Holiday Inspection}*

2. High voltage holiday detectors used for Coal Tar and X-Tru Coat shall not be used for inspection of thin film coatings.

F. Handling and Storage of Coating Materials

1. The Purchaser will supply all coating and wrapping materials, unless specified in the plans.

2. The Contractor shall supply his/her own application equipment.

3. Coating materials consigned to the job shall be properly stored and guarded against theft and damage. Pipe wrapping materials shall be protected from the elements.

4. The Contractor shall be responsible for the handling and utilization of coating materials in his/her possession, and shall reimburse the Purchaser for damaged materials. Coating and wrapping materials shall be handled in such a manner as to prevent damage to the packages. No packages shall be dropped or thrown from the trucks. The packages must not be handled with hooks.

5. All primers should be stirred before use, to prevent settlement of their components. Care must be taken to ensure that dirt or moisture does not contaminate the primer before or during application. Primers that continue to show settlement after stirring or are contaminated shall be properly discarded.

G. Field Coating

1. The Contractor shall clean the pipe and apply the pipe coating for field patching in all places on the pipe not mill coated, all places where connections have been made, and where the coating is damaged or defective. *{Gas Std. 7.2.1.2: Field Coating Methods}*

2. Materials used for the repair of coating defects shall include; wax compatible primer, wax tape, petrolatum tape heat shrink sleeve, hot melt patch compound, or epoxy coating.

3. Since contact of coating materials with the skin or eyes may be irritating, consideration should be given to the wearing of gloves, long sleeved shirts, and eye protection during application.

4. Prolonged breathing of fumes shall be avoided. Coatings should be applied from an upwind position. When applying coatings in poorly ventilated areas, the proper type of

respirator shall be used. *{Gas Std. 8.1.1: Safe Breathing Mixtures and Signs of Asphyxiation}*

5. The Contractor shall repair all coating defects found during the visual or electrical inspections.

H. Hot Melt Patch (3M Scotchkote Hot Melt patch Compound 226P)

1. The repair of surfaces with less than two (2) square inches may be made by Hot Melt Patch Compounds, patching sticks or methods approved by Purchaser.

2. To ensure good adhesion, roughen the surface of the parent FBE coating using 80-grit to 120-grit sandpaper. Clean the surface and wipe away the sanding residue with a non-contaminating cloth.

3. Preheat the parent-coating surface using a non-contaminating heat source, such as portable hand-held propane torch. Heat should be applied in a manner that avoids burning or charring of the epoxy coating. Slight browning of the parent coating is acceptable, but charring or blistering is not. Avoid heat application directly to the patchstick while prewarming the coating surface.

4. While continuing to heat the FBE surface, occasionally draw the patchstick across the repair area until it leaves a residue. Then rub the stick in a circular motion and utilize the torch to help melt it and maintain the pipe coating temperature. Continue until the patch is smooth and has a thickness of at least 15 mils greater than the parent coating.

5. Allow the patch to cool before handling.

I. Heat Shrink Sleeves

1. The joint coating over the regular butt weld pipe joints, at the option of Purchaser, shall be a heat shrinking expanded polyethylene sleeve or an epoxy coating.

2. The Contractor shall be required to furnish an approved type propane torch for the installation of heat shrinking expanded polyethylene sleeves as directed by Purchaser.

3. The heat shrink material shall be installed in accordance with manufacturer's recommendations. The pipe must be heated to temperature specified by manufacturer. Under no circumstances shall the heat shrink be installed on ambient temperature pipe.

J. Wax Tape Coating Application (GD60.462)

1. Trenton #1 wax tape is now the preferred method for coating small sections of steel mains and steel fittings. Care must be given if this product is to be used in the vicinity

of plastic pipe. Remove any primer that comes into contact with any plastic fitting/pipe with rag before backfilling the hole.

Note: this coating is only to be used for below ground applications.

2. Wire brush and scrape the surface clean of dirt, loose coating and loose rust. Insure proper PPE is used for this process.

3. Apply a thin film of Wax-Tape Primer. If the surface is wet, cold or rusty, rub and press the primer to displace moisture to ensure adhesion. The temperature range for application is from 0^0 F to 110^0 F. Use of gloves are recommended to reduce the possibility of cuts during installation.

4. Wrap the Trenton #1Wax-Tape using a 1" overlap. On straight pipe, apply slight tension to ensure contact with the surface. On irregular surfaces, allow slack so the tape can be molded into conformity. In either case, press and form the tape so there are no air pockets or voids under the tape. Also, press and smooth out the lap seams to ensure they are sealed. To facilitate installation on couplings, it is recommended that small pieces of the wax tape be cut to cover the studs or bolts/nuts.

5. For below ground pipes that are located in rocky soils, the use of a rock shield or select backfill should be considered.

6. The tape does not require curing or drying time, so it can be backfilled immediately after installation.

K. Petrolatum Tape Coating Application (Densyl Tape)

1. Prepare surfaces by removing all loose scale, rust or other foreign matter in accordance to SSPC SP2 "Hand Tool Cleaning" or SP3 "Power Tool Cleaning" See Appendix "5-A".
   A high pressure water wash of 3,000 - 7,000 psi is also suitable.

2. Apply a thin film of Denso Paste, which serves as a primer.

3. Wrap the tape in a spiral fashion with a minimum 1" overlap. For severely corrosive environments, a 55% overlap is recommended.

4. While wrapping, press air pockets out and smooth all lap seams.

5. For additional mechanical protection, an overwrap may be used to increase impact strength and electrical resistance.

6. For irregular surfaces such as valves, flanges, use of Densyl Mastic or Denso Profiling Mastic or an approved liquid epoxy with the proper surface preparation.

L. Denso Protal (Epoxy)

1. The proper materials recommended by the manufacture must be used for blasting.

2. All surfaces to be coated shall be grit blasted to a near-white finish (SSPC SP-10 or NACE No. 2). Appendix "5-A"

   Note: Near-white finish is interpreted to mean that all metal surfaces shall be blast cleaned to remove all dirt, mill scale, rust, corrosion products, oxides, paint and other foreign matter. Very light shadow, very light streaks or slight discolorations shall be acceptable; however, at least 95% of the surface shall have the uniform gray appearance of a white metal blast-cleaned surface.

3. Edges of the existing coating shall be roughened by power brushing or by sweep blasting the coating for a distance of 1" minimum.

4. All contaminants shall be removed from the steel surface to be coated. Oil and grease should be removed in accordance with SSPC SP-1 using non-oily solvent cleaner (i.e. xylene, MEK, ethanol, etc.).

5. The Contractor shall check the surface profile depth by using a suitable surface profile gauge (e.g. Press-O-Film Gauge or equal).

6. Metal areas that develop flash rust due to exposure to rain or moisture shall be given a sweep blast to return them to their originally blasted condition before application.

   a. Application

      1. The surface shall have no condensation, precipitation or any other forms of contamination on the blasted surface prior to coating.

      2. The substrate temperature range for application of Protal is 50°F to 185°F. The substrate temperature must be a minimum of 5°F above the dew point temperature before proceeding with the coating operation. Ambient temperature may be lower than 50°F if the substrate is heated. Preheating may be accomplished with a propane torch or induction coil prior to application.

      3. Protal shall be applied to the specified Dry Film Thickness (DFT) up to 40 mils using a brush, Denso applicator pad or roller. Wet film measurements shall be continuously performed to ensure close adherence to the thickness specification.

      4. Mixing: Make sure the part A (Resin) and Part B (Hardener) components match in both material and size as specified on the containers. Mix the B

component first, independent of the resin. Pour the contents into the part A (Resin) component. Mix for approximately 2 minutes until a uniform color is achieved making sure to scrape the bottom and sides of the container. Mixing should continue until there are no visible streaks showing in the mixture.

5. APPLICATION SHALL TAKE PLACE IMMEDIATELY AFTER MIXING. Pour the product onto the surface and spread down and around the surface in bands beginning from the leading edge of the existing coating to as far under the pipe as can be reached. Overlap the bands onto the existing coating a minimum of 1". The person applying the mixture shall use a brush to smooth out any obvious sags or rough edges, valleys, or drips. Special attention shall be given to weld buttons and bottom surfaces.

6. The thickness of Protal shall be checked periodically by a wet film gauge to insure the minimum wet film thickness specified. After the Protal has cured to a tack-free condition, the owner's representative and/or contractor's inspector should measure the film thickness by a magnetic gauge and notify the applicator of their acceptance. Notification to the applicator of any inadequately coated sections must be made immediately.

7. Over-coating, when necessary, shall take place within 2 hours. The surface shall be roughed prior to application of the topcoat using 80 grit sand papers or by sand blasting.

b. Inspection/Testing For Backfill

1. The finished coating shall be generally smooth and free of protuberances or holidays. All surfaces shall have the required minimum Dry Film thickness .Inspection of hand application is best performed immediately after application.

2. Backfill time shall be determined by the "thumb nail test." The thumbnail test is defined when one can no longer make a permanent indentation in the coating with his or her thumbnail. Note: A full and/or chemical cure may not be achieved by backfill time. Therefore, in wet soils the coating will need a full chemical cure.

3. An acceptable field-test to check to see if the coating has a full chemical cure, a solvent such as Xylen, MEK or Toluene can be rubbed on to the coating. If the gloss/sheen is removed, the coating is not fully cured.

4. Spark testing shall be performed to ensure proper film thickness and for holiday inspection. The high voltage, or spark test method, can be used to test coatings up to 7.5mm (300mils) thick. This method is ideal for inspecting pipelines and other protective coatings. Coatings on concrete can also be tested this way. A power supply generates a high DC voltage,

which is connected to a suitable probe, and an earth return is connected to the substrate. As the probe is passed over the coated substrate, a flaw is indicated by a spark at the contact point which sets off the alarm. This technique is suitable for locating various types of coating of flaws. Care is required on thin coatings. The voltage used for testing weld joints and field applications shall be equal to that used for testing the mainline coating in the field not to exceed 100 volts per mil or a maximum of 2000 volts for the typical 20 mil minimum requirements.

Appendix "5-A"
Surface Preparation Standards

Surface Preparation Standards

A. Steel Structures Painting Council (SSPC)

1 SP-1 Solvent Cleaning
2 SP-2 Hand Tool Cleaning
3 SP-3 Power Tool Cleaning
4 SP-4 Flame Cleaning
5 SP-5 White Metal Blast Cleaning
6 SP-6 Commercial Blast Cleaning
7 SP-7 Brush-Off Blast Cleaning
8 SP-8 Pickling
9 SP-9 Weathering Followed By Blast Cleaning
10 SP-10 Near-White Blast Cleaning

B. National Association of Corrosion Engineers (NACE)

1 NACE 1 White Metal Blast Cleaning
2 NACE 2 Near-White Blast Cleaning
3 NACE 3 Commercial Blast Cleaning

C. Surface Preparation Standards – Definitions

1. SSPC-SP-1 Solvent Cleaning - Removal of all detrimental foreign matter such as oil, grease, dirt, soil, salts, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam or other similar materials and methods which involve a solvent or cleaning action.

2. SSPC-SP-2 Hand Tool Cleaning - Removal of all rust scale, mill scale, loose rust and loose paint to the degree specified by hand wire brushing, hand sanding, hand scraping, hand chipping or other hand impact tools or by a combination of these methods. The substrate should have a faint metallic sheen and also be free of oil, grease, dust, soil, salts and other contaminants.

3. SSPC-SP-3 Power Tool Cleaning - Removal of all rust scale, mill scale, loose paint, and loose rust to the degree specified by power wire brushes, power impact tools, power grinders, power sanders or by a combination of these methods. The substrate should have a pronounced metallic sheen and also be free of oil, grease, dirt, soil, salts and other contaminants. Surface should not be buffed or polished smooth.

4. SSPC-SP-4 Flame Cleaning - Removal of all loose scale, rust and other detrimental foreign matter by passing high temperature, high velocity oxy-acetylene flames over the entire surface, followed by wire brushing. Surface should also be free of oil, grease, dirt, soil, salts and other contaminants.

5. SSPC-SP-5 (NACE 1) White Metal Blast Cleaning - Removal of all mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels. A White Metal Blast Cleaned Surface Finish is defined as a surface with a gray-white, uniform metallic color, slightly roughened to form a suitable anchor pattern for coatings. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter.

6. SSPC-SP6 (NACE 3) Commercial Blast Cleaning - Removal of mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree specified. A Commercial Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale and foreign matter have been completely removed from the surface and all rust, mill scale and old paint have been completely removed except for slight shadows, streaks, or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain; if the surface is pitted, slight residues of rust or paint may be found in the bottom of pits; at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discoloration, slight staining or tight residues mentioned above.

7. SSPC-SP-7 Brush-Off Blast Cleaning - Removal of loose mill scale, loose rust, and loose paint, to the degree hereafter specified, by the impact of abrasives propelled through nozzles or by centrifugal wheels. It is not intended that the surface shall be free of all mill scale, rust, and paint. The remaining mill scale, rust, and paint should be tight and the surface should be sufficiently abraded to provide good adhesion and bonding of paint. A Brush-Off Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale, loose mill scale, loose rust and loose paint or coatings are removed completely but tight mill scale and tightly adhered rust, paint and coatings are permitted to remain provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.

8. SSPC-SP-8 Pickling - Removal of all mill scale, rust and rust scale by chemical reaction, or by electrolysis, or by both. It is intended that the pickled surface shall be completely free of all scale, rust, and foreign matter. Furthermore, the surface shall be free of unreacted or harmful acid or alkali, or smut.

9. SSPC-SP-9 Weathering Followed By Blast Cleaning - Weathering to remove all or part of the mill scale followed by one of the blast cleaning standards.

10. SSPC-SP-10 (NACE 2) Near-White Blast Cleaning - Removal of nearly all mill scale, rust, rust scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree hereafter specified. A Near-White Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides, or light, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discoloration mentioned above.

Section 6

Installing Plastic Pipe

This specification covers the General Conditions and the Technical Requirements for the storage, handling, joining of plastic pipe and fittings, and the installation of plastic gas mains and associated appurtenances under the contract proposal or by using company construction forces. Mains and services covered by this specification will be used for the distribution of natural gas at a maximum pressure of 60 psig. Piping covered by this specification is limited to a maximum nominal diameter of twelve (12) inches.

A. Materials

1. The Purchaser will furnish the plastic pipe, fittings, valves, and appurtenances.

2. The pipe and fittings will be made of polyethylene, conforming to the Duke Energy Polyethylene Pipe and Fitting Specification Procedure GD215.

3. The pipe will be made available in coils or straight lengths. Valves for use in plastic systems will be either metallic or plastic bodied. *{Gas Std. 2.16.1: Polyethylene Pipe & Tubing}*

B. Handling of Plastic Pipe

1. Pipe trailers shall be required by the Contractor for handling coiled pipe. Brecon does not have the equipment necessary to deliver 6 inch coiled pipe to the job site. The Purchaser will make every effort to have the large diameter coils delivered to the Contractor's material holding area at the start of each project. If the Purchaser is unable to make these arrangements, it shall be necessary for the large diameter coils to be picked up at Brecon by the Contractor. The Purchaser will pay the Contractor for pickup and delivery in these cases. *{Gas Std. 2.16.20: Receiving, Handling and Storage of Polyethylene Pipe, Tubing and Fittings}*

COILED PIPE TRAILER SPECIFICATIONS
Single and/or Twin Axle Electric Brake Trailer for 3", 4" and 6"

Coil Capacity Specifications
The coil dimensions of the current Performance Pipe (Driscopipe/Plexco) product that the trailer will need to be able to accommodate are:

	Coil Footage	Wt. Per Coil	Min. Coil ID	Max. Coil OD	Width
2"	500'	315 lbs.	51"	78"	13"
3"	315'	422 lbs.	68"	96"	15"
4"	500'	1110 lbs.	68"	94"	41"
6"	500'	2040 lbs.	84"	120"	50"

The capacity of the trailer must be able to accept all current known coil sizes from all major manufacturers of 2", 3", 4" and 6" plastic pipe.

2. Loading System – The trailer will need to have some form of loading mechanism in which the trailer can be field loaded from a Brecon material truck at the job site or loaded at the pipe yard at the Brecon facility. If the trailer does not have a loading mechanism, then the Contractor should make provisions to have the necessary equipment available to safely load the coils without damaging the pipe.

3. Re-rounding/Taming Equipment – The trailer will be equipped with the necessary equipment to re-round the coiled pipe and remove the curvature conditions created in the pipe by the coiling process. Pipe should be able to lie flat in a trench when straightening is complete as well as not to cause additional stresses to the pipe when inserting.

4. Polyethylene pipe can be easily handled with forklifts or hydro-cranes. When unloading or loading with a hydro-crane, use wide belly slings or a spreader bar with a fabric sling to prevent damage to the pipe. When lifting, axial bending of the pipe can be minimized by using a spreader bar, this technique also helps protect the pipe ends from damage.

5. Pipe coils or straight lengths must never be dropped or rolled from the truck or trailer bed. This is particularly important when unloading pipe in cold weather. At lower temperatures, the pipe is stiffer and more susceptible to damage from impact.

6. Polyethylene pipe, tubing, and fittings should be kept clean. They should be stored in their original packing until ready for use.

7. Care must be exercised at all times to protect polyethylene material from fire, excessive heat, or harmful chemicals. Prevent contact with cleaning solutions, solvents, alcohol, etc.

8. Storage areas will be clean, level, and free of rocks or any other object likely to damage the pipe. The polyethylene pipe and tubing will be supported in a manner as to prevent deformation of the material.

9. All fractured, kinked, buckled, deep gouged, cut pipe or pipe contaminated by exhaust, oil, or dirt will not be used. (An injurious gouge is defined as one who exceeds 10% of the minimum wall thickness for each pipe size).

C. Qualification of Joining Personnel

1. All personnel who perform joining of plastic pipe and fittings shall be qualified to federal and state code requirements, including but not limited to CFR Title 49, Subpart F: 192.285 Plastic Pipe.

2. A "Contractor Qualification Card" will be issued to the qualified applicant/contractor upon successful completion of all qualification tests. This card must be carried by the qualified applicant/contractor at all times when performing fusions for the Purchaser.

3. Only personnel trained and qualified in accordance with the Purchaser's written fusion procedures and carrying the Duke Energy's Contractor Qualification Card may perform fusions on plastic pipe and fittings. Re-qualification shall be conducted annually. Also, re-qualification is required if a person has a total of three (3) production joints that are found unacceptable during a 12 month period.

4. All qualification tests shall be performed with the fusion equipment that will be used in the construction of the future projects. All fusion equipment must be inspected and approved by the Purchaser before it can be used. All equipment must have a serial number or a tracking number stamped on it, this number shall be logged upon completion of all inspection tests.

5. The fusions required for qualification are: 4" Butt Fusion, 6" Butt Fusion, 1" CTS Permaset Coupling, 4" Electrofusion Coupling, 4" X 1" CTS Electrofusion, Service Tee Fusion, 1" Electrofusion Coupling, and any other plastic joining fitting as required.

6. All fusions shall be visually inspected by the qualified operator during and after joining. The new joint must be found to have the same appearance as a joint, or photographs of a joint, that is considered acceptable under that fusion process.

7. Each production joint test sample will be inspected by a destructive bend test.

8. Destructive bend testing shall be performed by a Purchaser approved qualified Inspector. Each test sample will be cut out of the pipe to be no less than one foot on each side of the fusion joint. It will be dissected longitudinally into 1' wide strips. The strips will be deformed by bending. Any voids, discontinuities or failures in the fusion area will constitute a failed joint.

9. Only personnel trained and qualified in accordance with the Purchaser's written procedures may connect plastic pipe and steel using a posi-hold bolted coupling.

D. Joining Pipe, Tubing and Fittings *{ Gas Std. Section 2.17: Plastic Joining}*

1. Plastic to plastic joints and the connection of plastic pipe/tubing to plastic fittings will be made by heat fusion, or polyethylene coupling. Only qualified personnel and equipment are permitted to join polyethylene pipe. **Connection of plastic to plastic with a metallic mechanical coupling is also prohibited.**

2. Butt fusion will be considered the primary method of joining longitudinal sections of main. Rotary scrapers will be required when joining 4" and larger pipe in the ditch. Electro-fusion may be used at the discretion of the onsite Inspector. Electro-fusion couplings have been ordered for joining insertion or directional bored mains at

intervals of 500 feet. Bar clamps should be used to secure 2" coiled pipe when joined by electro-fusion. Vice-grip clamps cannot be used when joining runs of plastic mains together.

3. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe. Personnel found joining pipe without the proper line up clamps and fusion equipment will have their fusion cards taken away. **NO SECOND CHANCES WILL BE GIVEN FOR TAKING SHORT CUTS WHEN JOINING PIPE.**

4. Innogaz, Central Plastics, Uponor, M.T. Deason and Friatec are the approved electro-fusion systems. The Purchaser requires each fitting installed by a Contractor to be recorded on Duke Energy's construction print or Job Control Form. Approved electro-fusion clamps are required when making electro-fusion joints.

   Detailed procedures for joining plastic, pipe, tubing, and fittings are as follows:

   a. Butt Fusion ½" CTS-4" IPS (PE2406) *{Gas Std. 2.17.1* Butt Fusion for Polyethylene Pipe, Tubing & Fittings *}*
   b. Electro-fusion Couplings and Reducers *{Gas Std. 2.17.4* Installation of Coupling-Type Electrofusion Fittings*}*
   c. Electro-fusion Service Punch Tees *{Gas Std. 2.17.5* Installation & Tapping of Saddle-Type Electrofusion Fittings*}*
   d. Butt Fusion 2"-8" IPS *{Gas Std. 2.17.9* Butt Fusion For 2"-8" Polyethylene Pipe and Fittings Using McElroy No. 28 Fusion Unit*}*

5. Fusion equipment must be maintained in good condition and must be capable of producing sound joints when used in accordance with the manufacturer's instructions. Each piece of fusion equipment must be inspected and qualified by the Purchaser. Faulty equipment must be repaired or replaced.

6. Heater plates or adapters must be checked daily with a pyrometer for the correct surface temperature. The heater thermometer shall be used for reference only. Heater plates or adapters must be cleaned with a clean cotton cloth before making each joint.

7. All joints shall be inspected visually, and if there is any reason to believe that a joint is unacceptable, it shall be cut out and replaced.

   IMPORTANT: WHEN IN DOUBT, CUT-IT OUT

   Due to potential hazard of a failure, it is critical that all fusion joints are properly made. The Contractor's liability for any unacceptable fusion by visual examination or defect shall include the verification of the quality of all fusions on the specific project.

8. Production joints, selected by the Purchaser, may be cut out for testing by the Purchaser.

E. Transition Fittings and Mechanical Couplings

1. The connection between plastic pipe and steel pipe may be made with a Purchaser approved transition fitting *{Gas Std. 2.17.20: Transition Fittings - Steel Pipe to Polyethylene Pipe}* or a posi-hold bolted coupling *{Gas Std. 2.17.30: Steel(S) Pipe to Polyethylene (PE or PL) Pipe Connection Utilizing An IPS Pull-Out Resistant Bolted Coupling}*.

2. The transition fitting is a specialized mechanical fitting designed to provide a connection between plastic and steel systems. The fitting is a device consisting of a short length of coated steel pipe with a prefabricated connection to a short length of plastic pipe. The steel end is attached to the steel system by butt welding, by being welded to a flange, or prefabricated with a flange and connected to a flange. No other type of welding is allowed on the transition fitting. The plastic end is attached to the plastic system by heat fusion.

3. During the welding process, the transition connection and the plastic pipe must be protected from any excess heat generated. This is accomplished by wrapping the steel portion of the fitting with three turns of wet rags about 2' from the area to be welded. Wrap additional wet cloths around the fitting. If more than three welding passes are needed to complete the joint, the weld should be allowed to cool for five minutes before continuing. **DO NOT REMOVE** the wet cloths and tape until at least 10 minutes after completing the weld.

4. The posi-hold bolted coupling is designed to provide for pullout resistance when properly installed. The steel pipe ends must be cleaned of the coating, oil, dirt, loose scale, and rust. On the plastic pipe end, the recommended insert stiffener must be installed. Only personnel qualified by the Purchaser may install mechanical couplings on plastic pipe.

5. Plastic pipe jointed to metallic pipe will be installed free of tension.

F. Valve Installations

1. Valve installation shall include valve, pressure stems, and valve box. *{Gas Std. 2.6.5: Plastic Ball Valve Installation}*

2. All valves in plastic systems must be installed below grade and be equipped with supports and valve boxes. The valve box must not transmit traffic loads or other loads to the valve.

3. On large diameter valves, 3 feet of cover on the main may be inadequate. Main elevation should taper down to the valve location providing clearance between the valve and valve box. This is especially critical on street improvement work where adequate clearance from the top of the valve to the bottom of the road sub-base is necessary.

4. All plastic valves that are installed will be butt fused. A minimum 3 foot pup piece must be butt fused on each side of the valve to permit use of electro-fusion couplings. The application of cathodic protection materials and/or repairing the coating to a steel valve shall be included as part of the installation of the valve.

5. All valve assemblies must be supported on undisturbed or well compacted soil to limit stresses and strains to the plastic pipe.

6. The Purchaser reserves the right to add valves and appurtenances not shown on the drawings. ***Payment will be bid price if available; otherwise, a change order will be required.***

G. Tracer Wire

Tracer wire shall be installed on all polyethylene (plastic) gas main and services to facilitate future location of the buried distribution piping. *{Gas Std. 2.18.20: Tracer Wire Installation On Plastic Pipe – Main Line and Services}.*

1. Material

   a. For direct bury installations, use #12 AWG single conductor copper wire with 40 mil yellow polyethylene insulation.

   b. For directional drilled installations, use two (2) parallel strands of #8 AWG single conductor copper wire with 40 mil yellow polyethylene insulation.

2. Installation

   a. Tracer wire shall be placed along the pipe in a straight line (not wound around pipe) and secured to the pipe every 5 feet with a minimum of 3 overlapping circumferential wraps of ¾" PVC electrical tape.

   b. The tracer wire shall be protected from damage during installation of the gas piping. All breaks or cuts in the wire or its insulation shall be repaired prior to burial.

   c. Tracer wire boxes shall be installed over the plastic pipe at intervals of 500 feet or less and at all branch connections, elbows, and ends to provide access points for locating equipment. Installation locations should be chosen where possible damage to the boxes will be minimized.

d. The tracer wire shall be installed to extend a minimum of 2-feet above ground at all tracer box locations. At intermediate tracer box locations, loop (do not cut) the wire up through the tracer box to keep continuity.

e. Attach the tracer wire to the tracer box lid and coil the wire back in the box.

3. Spliced Connections

a. All spliced or repaired wire connections in the tracer wire system with 3 or more wires shall be made using a wing nut wire connector and made waterproof using an approved buried service wire closure.

b. All 2 wire splices shall be connected with silicone filled wire nuts. Only a ½" of insulation shall be removed from the tracer wire so there is no exposed copper after the nut is twisted on.

c. Metallic round valve boxes shall be installed over the plastic pipe to provide tracer wire access locations at intervals not to exceed 500 feet. The valve boxes shall be installed at branch fittings, tees, changes of direction, and plastic ends. Metallic valves boxes are used to facilitate location in the event they become buried.

4. Testing of Tracer Wire

a. The Gas Contractor will be required to conduct tracer wire conductivity testing to prove that newly installed tracer wire is intact. Testing shall be conducted by authorized personnel using approved testing equipment and shall be supervised by the Contractor Inspector. **Pay sheets will not be signed for main or service pipe segment installation until tracer wire testing is completed between access points and accepted by the Contractor Inspector.** All costs for conductivity tests shall be included in the main or service installation item. If the tracer wire is not electrically continuous between access points, the contractor shall, at their expense, replace or repair the wire as required. Any replaced or repaired wire shall be re-tested for continuity and verified by the Contractor Inspector before the pay sheet is signed.

H. Installation Methods

Acceptable methods of gas main installation are direct bury, insertion, directional drilling, boring and in limited situations, pipe bursting or splitting. The main must be installed in accordance with the specified installation method as shown on the construction drawing unless an alternative method is submitted to and approved by the Duke Energy Design Engineer.

Plastic piping will **not** be installed above the ground, in a joint trench with sewer, in or on bridges, in vaults, river crossings, near steam lines, hot water lines or any other source of heat, and under any structures such as buildings, patios, carports, or breezeways.

1. Direct Bury

   a. The trench bottom shall be continuous, relatively smooth, and free of rock. Plastic piping shall be installed in such a way that shear, tensile, or compressive stresses resulting from construction, backfill, thermal contraction, or external loading are minimized.

   b. Sufficient clearance, not less than 2 feet, shall be maintained between the plastic piping and any sources of heat, such as steam, hot water, and foreign direct buried primary cables, to prevent the temperature of the plastic pipe from exceeding 140 deg. F. Changes in direction will be made with fusion elbows where the minimum bending radius of the plastic pipe must be exceeded. No fittings are permitted within three (3) feet of a bend.

   c. The Contractor shall remove liquids from the bottom of the trench before the main is lowered in. Precautions shall be taken to prevent floating of the main, draining of water into the main, and the caving of trenches.

   d. All trenches shall be visually inspected for sewer or septic facility damage. Visual inspection shall include examining both the trench and spoil for evidence of damage to sewer and septic facilities.

   e. The main shall be laid to the established grade with the pipe resting directly on the bottom of the trench or undisturbed soil.

   f. In the event of excessive rainfall and subsequent bad working conditions, the Purchaser may require the Contractor to postpone all operations until such time as the work can progress without excessive property damage.

   g. The width of the trench at any point below the top of the pipe shall be sufficient to provide adequate room for filling and compacting the side fills. Minimum trench width may be utilized by joining the pipe outside the trench and lowering into the trench after adequate joint strength has been obtained. Care shall be exercised to prevent gouging and strain which may buckle or over-stress the pipe or joints.

   h. The plastic gas main shall be installed with the amount of cover listed on the "issued" drawing.

   i. Plastic pipe is flexible and will bend to conform to the trench lines. Excessive bending must be avoided. Do not exceed the minimum bending radius for plastic pipe. *{Gas Std. 2.18.10: Polyethylene Pipe Bending Specifications}*

   j. Mitered joints along with cut or altered fittings are prohibited.

k. When long sections of piping that have been assembled alongside the trench are lowered, care will be taken to avoid any strains which may over stress or buckle the piping or impose excessive stress on the joints.

l. Plastic pipe shall be laid and continuously supported on undisturbed or well-compacted soil to minimize shear stresses. It shall not be supported by blocking. The side fills must be compacted to help prevent the plastic pipe from being crushed, buckled, or deflected. Branch connections will be made using butt fusion tees, or other suitable fittings, approved by the Purchaser and specifically designed for that purpose.

m. The ends of the joined pipe or tubing will be closed water tight except while work is being done on that end.

n. In existing areas, the minimum vertical separation of any foreign utility including water and sewer piping and plastic piping shall be 18 inches in Butler County, Ohio and 12 inches in all other areas, unless approval from Gas Engineering is given.

o. Plastic pipe will not be used to cross streams where buoyancy or crushing is a potential problem. The pipe shall be installed 5 feet below the firm or established bed of the stream. All stream crossings must be protected from physical damage and flotation. *{Gas Std. 2.18.2: Typical Stream Crossing Detail Polyethylene Pipe}*

2. Directional Drilling

a. Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. In cases where the contractor would like to directional drill instead of direct bury or the design calls for directional drill, the approval by the Gas Engineering Sponsor will be required if any of the following occurs: rocky conditions, parallel 3rd party utility within 3 feet, a City of Cincinnati curb is within 3-ft., or any Metropolitan Sewer or Clermont County Water or Sewer is within 5-ft. *{Gas Std. 2.18.43: Weak Links for Pulling Polyethylene Pipe}*

b. The Gas Engineering Sponsor must approve directional drilling of any standard pressure main.

c. Directional drilling will require a profile indicating the location and depth such that appropriate data can be placed on the mapping system. The profile must be in the form of marking depths on the plan sheet approximately every fifty (50) feet.

d. Spot holes or locate holes for 3rd party utilities, under hard pavement for directional drill bores should be done with a vacuum truck to eliminate 4 ft. x 2 ft. restoration holes. The City of Cincinnati does require a 1-foot cut back for small restoration areas.

e. The location and depth of all sewer mains, laterals and drain lines shall be determined and documented prior to drilling gas main to ensure there is no conflict between the proposed gas main and the existing sewer. A plan for locating sewer mains, laterals and drain lines must be submitted to Duke Energy and approved prior to the Contractor performing any drill work.

f. Acceptable methods for locating the mains, laterals and drain lines are using a camera or physically uncovering the mains, laterals and drain lines. If the Contractor chooses to use the camera method, it is required to (1) determine the location and depth of the sewer mains, laterals and drain lines before drilling begins; and (2) confirm after the installation of gas facilities that no breach has occurred.

g. Sewer clean-outs may be installed on a case by case situation and acceptance will be determined by a Duke Energy representative. The Contractor must install a sewer tag on every clean out if the main or any portion of the service is installed by trenchless technology. Duke Energy will provide the tags.

h. Directional drilling will not ordinarily be used on Street Improvement projects. If, however, directional drilling is accepted, test holes will be required at least every 100 feet. Service tie-ins can double as test holes.

i. When directionally boring on replacements or main extensions, one test hole for every 150' oft bore will be required to verify location and depth of the facility.

3. Joint Trench

a. Plastic pipe and fittings may be installed with up to three (3) other utilities in a common trench, referred to as joint trench construction. In all cases there shall be a 6-inch separation between the plastic main and any other utility line. *{Gas Std. 2.18.3: Joint Electric, Gas, Telephone and CATV Installation}*

b. The area between the gas main and other utilities shall be compacted bank run (with some rounded stone) or sand to ensure the continual required separation. Bank run, sand and spoil shall be compacted in accordance with Section 7 "Backfill" of this procedure or permitting agencies requirements. Vibratory compaction equipment is approved for use over plastic pipe. Impact compaction equipment is **not** approved for use over plastic pipe.

c. Rolling and grading shall be used to consolidate final backfill when the joint trench is outside the street rights of way.

4. Boring for Casing (KDOT)

a. The Contractor shall provide all necessary equipment to bore roadways and/or driveways in accordance with the Purchaser's construction drawings and specifications.

b. Jacking may be permitted with the agreement of the Design Engineer. All damaged main must be removed and must not be used. Any damaged coating must be repaired before acceptance. The Purchaser assumes no responsibility for failed attempts.

c. "Boring-With Casing" includes all excavation, hand or otherwise, required for placing the casing inside the bore including the bore pit. The bore is to be installed per design at the designated depth. The new casing must be positioned in such a fashion that no additional fittings will be required on the new main and that there will be no undue stress placed on the new main when installed. All casing joints must be welded per Duke Energy's welding standards to prevent water from entering the casing.

d. Casings:

   i. In locations where metallic casings are required, the casing must be reamed and cleaned to the extent necessary to remove any sharp edges, projections, dust, welding slag, or abrasive material which could damage the plastic pipe during and after insertion.

   ii. Plastic pipe or tubing shall be inserted into the casing pipe in such a manner as to protect the plastic during the installation. Pushing the pipe in is preferred to pulling it in to prevent excessive tensile loading. When pulling, a weak link must be used. The leading end of the plastic must be closed water tight before insertion.

   iii. A protective inner sleeve will be used to prevent the plastic pipe from bearing on the end of the metallic casing. After insertion, the ends of all casings will be closed off with closed cell foam material or duct seal to prevent water and backfill material from accumulating in the casing.

   iv. Any portion of plastic pipe which spans disturbed earth must be protected by bridging, by compaction of the soil under the plastic pipe or by other means to prevent the settling of the backfill from shearing the plastic pipe.

   v. Any portion of plastic pipe unsupported due to the removal of a section of the casing pipe must be supported with bridging or other means, so as to withstand the anticipated external soil loading.

e. Driving of pipe will not be permitted.

f. Tunneling shall be done only upon agreement with the Purchaser or where required by and in a manner as specified by the Purchaser or public authorities. The Contractor shall provide all adequate shoring for trenches and boxing for tunnels where necessary upon agreement with the Purchaser. The Contractor must have a competent person on site to ensure OSHA Shoring Regulations are being followed. {*Gas Standard Section 12: Excavations*}

5. Boring for Plastic Pipe

   a. The borehole size must be at least the next pipe diameter larger than the pipe size being installed.

   b. When using a mechanical assist to pull plastic pipe through a bore hole, a "weak link" must be used between the pulling head and the pipe being pulled to protect the pipe from being over-stressed. *{Gas Standard 2.18.43: Weak Links For Pulling Polyethylene Pipe During Insertion and Boring Operations}*. The Contractor must provide specifications to the Inspector when using a mechanical weak link.

   c. A section of pipe will be brought beyond the exit hole and investigated for possible damage.

   d. The borehole will not be used any time that the bore causes the pavement to hump.

   e. Before a main is installed by boring or directional drilling, the location and depth of all existing utilities and sewer laterals must be determined. A plan showing the location of existing sewer laterals must be submitted to the Purchaser and approved prior to the Contractor performing any directional drill work. Acceptable methods for locating the existing sewer laterals are by camera/sonde or by physically uncovering the lateral.

   f. All bores shall be installed per depth listed on the "issued" drawing. If the depth is not listed, it must be assumed that a cover of 3 feet will be required.

   g. All bores must be installed within +/-1 foot horizontally of the designed location unless waivers are authorized in writing by the Design Engineer.

6. Installation by "Insertion"

   a. Insertion projects will require all customers to be back in service the same day.

   b. When using a mechanical assist to pull new plastic pipe through an existing main, a "weak link" must be used between the pulling head and the pipe being pulled to protect the pipe from being over-stressed. *{Gas Standard 2.18.43: Pulling Plastic*

pipe During Insertion and Boring}. The Contractor must provide specifications to the Inspector when using a mechanical weak link.

c. Pipelines will be leak surveyed by the on-site Inspector in accordance with the Purchaser's standards.

d. The removal of segments of pipe associated with insertion and service reconnection activities must be removed from the job site and disposed of in an approved landfill.

7. Installation by "Planting Method"

a. The plastic pipe and tubing installed by "planting" shall be defined as the burial of coiled tubing or pipe by feeding through a cable laying type plow, at a minimum cover of 24-inches, with no movement of the installed pipe or tubing relative to the adjacent earth.

b. The "planting" method should be used along an approved route, where applicable, when directed to do so by the Purchaser.

c. The planting of continuous lengths of plastic pipe will be limited to the technique that utilizes a vibratory type of plow-in equipment, approved by the Purchaser.

d. The Contractor shall furnish a proposed planting procedure and equipment list for approval by the Purchaser.

e. The Purchaser reserves the right to prohibit the "planting" installation where, in the opinion of the Purchaser's Engineer, is likely to produce an unsatisfactory installation.

Section 7
Main and Service Tie-Ins

A. Contractor Responsibility

1. Duke Energy intends to perform all tie-ins with Duke Energy crews, however the Contractor may be required to perform tie-ins in certain situations. This shall require the installation and tapping of TD Williamson fittings, squeezing polyethylene mains and installing the appropriate saddles and making appropriate taps for connecting to cast iron mains. The Contractor shall be required to have the proper TD Williamson equipment, guillotine saws, pressure gages and pertinent equipment necessary to tie into 2 through 6 inch steel mains. All Contractors are required to have squeeze off equipment, pressure gages and pertinent equipment necessary to tie in 2 through 8 inch polyethylene and stopper bags for tying into 2 through 12 inch cast iron.

2. The tie-in shall include the preparation of any and all by-pass requirements, the installation of fittings, such as TD Williamson, excavation, preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with the Purchaser's standards. The Contractor shall be responsible for the abandonment of the existing facilities, including purging and sealing the ends in accordance with the Purchaser's standards.

3. The Contractor is to inform the Purchaser on projects that require 8 and 12 inch IP tie-ins and their intention to perform the work or have the Purchaser's crew perform the work.

4. It shall be the responsibility of the Contractor to meet with the Inspector, prior to scheduling any tie-in work, to discuss the equipment and personnel necessary to perform the work. The Purchaser will provide pressure crews to assist on the tie-in and purging activities.

5. The time associated with separating the existing gas facilities and reconnecting to the new main will be paid on an hourly basis. Flag-persons, arrow-boards, and plates required for tie in work will be paid on a time and material basis. Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins, to insure completion in a timely manner.

6. Wipe tests are not required when performing tie-ins, however, should the Contractor see any liquid condensate, the onsite inspector must be notified. Duke Energy will provide roll off containers to the contractor. The Contractor is responsible to provide a space for a roll off container to collect possible PCB contaminated pipe. The contract personnel are responsible for keeping the roll off container covered at all times.

B. Service Installations

Note: The Gas Contractor shall be required to renew customer services from the gas main to the customer's service meter, as needed. Customer service lines are broken into two segments: the main to curb cock portion (M-C) and the curb cock to service meter portion (C-M).

1. The Purchaser will provide training to the Contractor on the renewal of services by insertion and direct bury installation of meter sets, turn off, turn on and appliance light up. The Contractor shall be required to review company policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Safety procedures, grounding procedures and a review for sizing services will also be provided at the training session. There will be no charge to the Contractor for this training.

2. The Contractor may be required to renew services main to curb and curb to meter.

3. On all AMRP work, the metallic (steel and copper) residential curb to meter services will be renewed.

4. Services that are polyethylene and pass the required pressure test will not be renewed and will be reconnected to the new main.

5. The minimum depth of services on customer owned property is 18 inches. The minimum depth on street right of way is the depth of the main or the local governmental requirements, whichever is greater.

6. The Gas Contractor is required to complete all associated Job Completion Forms (JCF's) with the service work. The completion of the JCF's is required within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.

7. The meters may be relocated to the outside if the services or meters are found in an unacceptable location.

8. The Contractor may be required to rebuild the customer's meter sets associated with the renewal of curb to meter services along with associated meter and riser brackets.

9. The Contractor shall also be required to turn off and to re-light customer appliances in accordance with the planned replacement work and the Purchaser's approved procedures.

    a. The Contractor must contact the Inspector whenever any appliances are found to be unacceptable. Bad appliances will be referred to the Purchaser's Service

Delivery Department and red tagged. The Purchaser will deal with the customer.

C. Main to Curb (M-C) Service

~~1.~~ The main to curb service replacements shall include excavating at the curb valve for reconnecting to the curb to meter portion of the service, and installing weld-o-let, service tee, excess flow valve when required (see Gas Standard 3.8.1), service piping, curb cock, cap, setting of the curb box to grade, air test, soft restoration and C-M tie-in.

2. Main to Curb services will be classified as either short-side M-C or long-side M-C. M-C short side services are less than 15 feet in length, regardless of the installation conditions. M-C long side services are 15 feet or longer in length and usually cross under roadways. It is possible to have all long side (crossover) services on a project. The M-C portion of the service lines must be installed at the depth of the main or as specified in street right of way or at the depth required by the local governmental agency, whichever is greater. Street improvement plans typically contain cross section sheets which should be used to determine the depth of services. If cross section sheets are not included on the available prints, it shall be the Contractor's responsibility to request the sheets from the Design Engineer before the installation of any services.

3. The use of split duck for shear protection on the electrofusion tee outlet has been discontinued. The service pipe shall be installed with a smooth, gradual transition from the service tee to the required service installation depth. Sudden elevation changes in the service pipe overstress the service tee and can cause it to fracture over time.

4. On some projects, it may be possible to reconnect the existing M-C service to the new gas main if the service is non-metallic and if the service passes the required pressure test.

5. All personnel must be trained and qualified in accordance with the Purchaser's procedures to connect service curb cocks.

6. Curb cocks should not be installed in the sidewalk without the inspectors' approval prior to installation.

7. All service holes located outside the pavement area are to be covered with ¾" plywood with flasher barricades or snow fencing while left open and unattended.

8. When encountering a gas street lamp, the service to this will be considered M-C only and the actual connection to the lamp will be done by the Cincinnati Gas Light Company or other Duke Energy selected contractor.

D. Curb to Meter (C-M) Service

1. Curb to Meter service replacements shall include turning on and off appliances, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set (including setting a new meter bracket and replacement of the meter as required), and re-lighting the customer appliances.

2. Renewed C-M service lines shall be installed at a minimum depth of 18 inches on customer owned property. Gas Contractors are to gas track their own service work, which includes all inside and outside meter sets in addition to soap testing. The inspection must be done by someone other than the installer. Every C-M service renewal or meter replacement must be gas tracked the same day it is installed. No leaks will be tolerated on inside meter sets, cards will be pulled as a consequence of not adhering to this requirement.

3. When renewing a C-M service by insertion, tracer wire must be attached from the curb cock to the street end of the casing and from the house end of the casing to the riser. This will facilitate locating of C-M services in the field.

   a. "Conversion" projects – where the C-M portion of the service is inserted and has a metallic curb cock, a tracer wire must be attached to the parent metal of the original service pipe and run up in the curb box. At the riser, tracer wire is to be attached to the parent metal of the original service and the other end attached to the riser bracket.

   b. "Conversion" projects – where the C-M portion of the service is inserted and is not in a straight line with the meter and has a plastic curb cock, a tracer wire must be attached to the parent metal of the original service pipe and run up in the curb box. At the riser, tracer wire is to be attached to the parent metal of the original service and the other end attached to the riser bracket.

4. "Conversion" projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators, vent piping and the possible removal of orifices.

5. "Replacement" projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping.

6. If old style regulators with 3/4" vents are encountered, they shall be replaced with a new regulator (1" vent). The new 1" vent pipe shall not be reduced to 3/4/".

7. Curb to Meter services that are polyethylene and pass the required pressure test will not be renewed.

8. The Gas Contractor shall be required to replace tin meters and regulators associated with the renewal of curb to meter services. Duke Energy will train Contractor's employees at Duke Energy's cost on the policies associated with spotting unacceptable meter and house service line locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Actual removal will require a 48-hour notice before the removal can begin.

9. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

10. When moving remote meters to the outside of a building, the Contractor must reuse the existing meter and reattach the remote reader and verify that reads of the meter and the remote are the same. In Ohio, when moving meters outside, make sure to replace any non-temperature compensated meters with a temperature compensated meter.

    Note: In Kentucky, a temperature compensated meter will be installed during the meter age change process.

    a. When moving meters from the inside the basement to the outside or relocating the meter in the basement, the contractor will be required to remove the old casing pipe going through the wall and seal the hole with hydraulic cement.

11. The only approved methods of installation for C-M's without the acquisition of a waiver are direct bury and insertion. In the event that circumstances prevent installation by one of these two pre-approved methods, a waiver requesting a variance to install all or part of the C-M service via a trenchless technology must be requested from the Duke Energy Construction Supervisor or job sponsor. The contractor must obtain a signed copy of the waiver prior to renewing the service utilizing trenchless technology.

~~12.~~ Large Service Renewal – The renewal of services 2" and larger shall include turning on and off appliances, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set (including setting a new meter bracket and replacement of the meter as directed by the Gas Inspector), and re-lighting the customer appliances.

13. Service Risers through retaining walls – Several communities have expressed concerns with service risers through walls (generally concrete retaining walls

next to sidewalks). Any drilling of the C-M portion of the gas service through walls will require a waiver. All efforts should be made to install a C-M service under retaining walls. When this is not possible, contact needs to be made with the homeowner to grant permission to drill through the wall. No hole will be drilled in a retaining wall without the knowledge of the homeowner. For unusual situations, a waiver may be granted to bore under the wall. Listed below are the preferred options for walls six (6) feet and less in height :

1. Insert a 1 inch PL service through the existing gas service, as long as the existing service is below ground.

2. For use on IP pressure systems and greater, insert a ½ inch PL service C-M through the existing gas service, as long as the existing service is below ground. This option must be approved by the Duke Energy Gas Inspector. Refer to Appendix "7 - A" for guidelines and load requirements.

3. Drill a 1 inch PL service C-M under the wall. This may require digging a hole 2 feet below the ground level on the customer side of the wall and shooting a missile under the wall.

4. As a last resort, hang the riser on the retaining wall and move the gas meter outside of the building, except in the City of Cincinnati where notification to the Job Sponsor must be made before any work is begun.

E. Curb to Meter (C-M) Service Trenchless Technology Waiver

1. The Contractor must notify the Duke Engineering representative at least 1 day prior to requiring the waiver. "All" underground drains and utilities must be either exposed or traced and marked prior to the arrival of the Duke Energy Representative.

2. Those drains that were not exposed will require a pre-bore locate as well as a post-bore video camera inspection as directed by the Gas Engineering representative. The house address should be included on the video and marked on the DVD itself with light scribe. See "Section 10" Sewer Location and Breech Prevention for greater detail.

3. The contractor's representative, who is responsible for locating and videotaping the underground drains, shall be required to sign his/her name on Duke Engineering's inspection document indicating they did what was required to protect the property owner's sewers and underground drains.

F. Test & Relight

1. The Test & Re-Light work includes turning on and off the gas service, separating existing facilities for testing, air testing, re-connecting the meter set, and re-lighting the customer appliances according to Duke Energy approved procedures.

2. Old Normac or Robroy flexible risers shall replaced with a new flexible riser before the pressure test and then relit after a successful pressure test.

APPENDIX "7 - A"

½" SERVICE DATA SHEET

1/2" PL Service Renewal IP pressure

Note: When using ½" service the customer loads must be obtained in order to determine if the pipe is large enough. The table below shows the maximum load allowable for a ½" service at given lengths. Engineering recommends that the total length of ½" pipe not exceed 100 ft. Equivalent footage for fittings is included. The length in the table will correspond with the actual field measurement. This table reflects a slightly larger than ½ psi pressure drop.

Service length in feet	Max load in CFH	Max load in BTU/hr
20	320	320,000
30	275	275,000
40	250	250,000
50	225	225,000
60	205	205,000
70	190	190,000
80	180	180,000
90	170	170,000
100	160	160,000

Section 8
Backfill

A. Backfill Requirements

1. Backfilling shall be done as soon as possible after the pipe has been placed in the trench and in such a manner as not to injure the pipe or coating.

2. The preferred method of backfilling shall be by using compacted excavated material from the trench provided such material consists of finely divided top soil, sand, or gravel. Back fill material must be free from organic matter, slag, cinders, frozen lumps, or debris; and, in the opinion of the Purchaser, is suitable for back filling.

3. The spoil removed from the excavation of a plastic main installation may be used as back fill material provided that it contains no stone greater than ½ inch in diameter. If it contains stone greater than ½ inch but less than 6 inches in diameter, at least 6 inches of bank run or sand must be placed over the plastic pipe before backfilling with the spoil.

4. The trench shall be backfilled with an approved material thoroughly compacted to a depth of (1) foot above the top of the pipe.

5. Excavated rocks or stones with any dimension greater than 6 inches must not be returned to the trench.

6. The backfill shall then be completed to grade, using the excavated material. Excavated material, which is not suitable for backfilling, shall be disposed of by the Contractor at the Contractor's expense and replaced with bank run, gravel or sand, at the price specified in the bid.

7. The Contractor's quoted price for main installation shall provide for back filling the trench with the material that was removed while excavating and the compaction of backfill using the proper compaction procedures. The Contractor shall be responsible for the condition of the trench and shall indemnify the Purchaser against damages resulting from improper backfill.

8. Padding shall be used at the discretion of the Inspector and/or Engineer. Padding is defined as bank run placed below and above the pipe and will be used in soils unsuitable for back fill. Bank run gravel shall be per ODOT 703.11 Ohio type 2 as listed in ODOT's "Construction Material Specification" or clean washed sand.

9. When rock, ledge, hardpan, or boulder is encountered, the trench bottom shall be undercut at least 4 inches and the undercut refilled with a pad of clean spoil, good-bearing bank run (with some rounded stone), or sand. See Typical Trench Detail (Gas Standard 2.18.1 Typical Trench Details – Polyethylene Pipe).

10. When ledge rock or hardpan is encountered during the construction of plastic main installation, at least 12 inches of bank run or sand must be placed over the plastic pipe. The side fills must be compacted to prevent the plastic pipe from being in contact with the rocky trench walls.

    b. Back filling shall be done in accordance with the rules of the governing agency responsible for the area where work is taking place, within the limits of all public or private roads and driveways.

    c. CLSM must be used as required within the hard surface areas by the appropriate governmental agency or as directed by Duke Energy. CDF, CLSM or Flashfill must meet the specifications of the appropriate governing agency (Hamilton Co./Cincinnati, ODOT or KDOT specifications).

11. The Contractor shall delay the back filling operations in cases where live connections will be made by the Purchaser soon after pipe installation has been completed. However, the Contractor shall be required to take the necessary measures to insure the stability of the open ditch (by shoring, etc.) until such time as the Purchaser moves on to complete the project. Should the Contractor complete all other phases of the work and leave the job site before the Purchaser's connections are made, the Purchaser will assume the responsibility of backfilling at these locations.

12. When backfilling in sod areas, the gas main, service tee and stop cock shall be covered with sand before backfilling the remainder of the excavation with the removed spoil. The service pipe shall be installed with a smooth, gradual transition from the service tee to the required service installation depth. Sudden elevation changes in the service pipe overstress the service tee and can cause it to fracture over time.

13. When backfilling in roadways on **2" – 6"** pipe, the gas main and service tee shall be covered with sand before backfilling the remainder of the excavation with the permit required backfill material. Sand shall be placed to a height of 6" above the pipe. For **8" and 12"** pipe, the excavation will be filled with permit required backfill material and **not** padded with sand to avoid settlement. If the required backfill is CLSM and the fill is over an extended length, placing sand over the main in a few locations may be required to prevent the main from "floating".

B. Backfill Compaction

1. Backfill Compaction" shall be defined as compaction by means of air tools, hand tools or machine tamping.

2. The Contractor is responsible for the pipe or casing he damages through backfilling operations. The Contractor shall be responsible for all necessary repairs and replacement due to said damages.

3. When crossing lawns, the back fill shall be thoroughly compacted to minimize future settlement. The top twelve (12) inches of backfill shall be shredded topsoil if sand backfill is used. The backfill shall be neatly rounded over the trench to a height sufficient to allow for settlement to grade after consolidation. The Contractor shall be responsible for the condition of the trench until consolidation has occurred, and shall indemnify the Purchaser against damages resulting from improper back fill.

4. If the back fill is to be **hand tamped** it shall be compacted in horizontal layers not exceeding four inches in depth.

5. Vibratory compaction equipment is approved for use over plastic pipe. Impact compaction equipment is not approved for use over plastic pipe.

6. Low Energy Compactors under 4,000 Ft. - Lbs.
Back fill material shall be placed and compacted in uniform horizontal layers not exceeding six (6) inches in thickness, loose measurement. Each layer shall be compacted by means of approved mechanical tampers. Successive blows of the tamper shall overlap no less than one-fourth of the width of the tamper head. Each layer shall be dampened when necessary to ensure the maximum density obtainable, or as directed.

7. High Energy Compactors Over 4,000 to 13,000 Ft. - Lbs.
Back fill material shall be placed in such a manner that the first layer, loose measurement, will provide a 2'-6" over above the pipe. After compaction of the first layer, each additional layer shall be compacted in uniform layers of twelve (12) inches, loose measurement.

8. Unless otherwise directed, trench compaction using select excavated spoils, shall meet the following minimum compaction requirements:

Trench Soil Compaction

Max. Lab. Dry Wt.	**Minimum Compaction Requirements***
Lbs./Cu. Ft.	**% Lab. Max**
90-104.9	98% of Standard
105-119.9	95% of Standard
120 & More	90% of Standard

Soils with a maximum dry weight of less than 90 pounds per cubic foot are considered unsuitable for use as back fill materials. *Measured at ½ depth of the fill.

9. Extreme care will be taken to ensure that the back fill material is adequately compacted both underneath and around gas pipe and fittings to prevent excessive

stress and shearing forces. Hand tamp around fittings where mechanical compaction cannot be used.

10. In the event that subsequent settlement occurs, the Contractor shall make the necessary repairs to the ditch at his/her expense.

11. Where the pipeline passes under main line sewers or culverts, and the installation was done by tunneling, the backfill material shall be controlled density fill or as directed by the Purchaser.

12. On slopes, the Contractor may be instructed to install a silt fence, field stone, rip rap, sandbags, water diversion terraces, or other surface treatments as directed by the Purchaser, to minimize washing of the trench.

13. Granular material may act as a trench drain and attract long term seepage where glacial outwash or wet zones within bedrock are penetrated. Outlet drainage must be provided consistent with the specific topography. A 4-inch perforated drain pipe must be installed at the direction of the Inspector with the granular material and run to daylight where practical.

14. The Contractor shall spread excess dirt across the right-of-way when requested by the landowner.

Section 9
Restoration

A. Restoration Requirements

1. All surface, subsurface structures and improved areas shall be restored by the Contractor to a condition at least equivalent to that prior to construction.

   a. Clean up and restoration on all projects must be in compliance with local governmental agency requirements and must be approved by the Duke Energy inspector.

2. The Purchaser's Gas Standard 2.14.0 through Gas Standard 2.14.23 is a general restoration guide for the Contractors. The Contractor shall supply all labor, machinery, tools, appliances, equipment and materials necessary to restore the various types of improved surfaces.

3. Areas which do not have comprehensive rules and regulations governing the opening and restoring of public ways shall be made in accordance with the appropriate Engineering Standards as determined by the Purchaser.

4. Where permitted, all surfaces shall be permanently restored immediately after adequate consolidation of the backfill has taken place. The Contractor may be required to provide and maintain a temporary surface until permanent restoration is made. Projects requiring the reconnection of customer service lines to the new facilities (replacement projects) will require permanent restoration to be completed after the service work are completed. This work must be coordinated with the Purchaser.

5. Surface restoration shall be made to the satisfaction of the inspector/responsible government agency.

6. The Contractor shall properly dispose of all construction debris and leave the working area in a clean condition.

7. Ditches disturbed during construction shall be restored promptly and graded for proper drainage.

9. The Contractor shall grade, remove large surface rock, seed and straw the work area with a seed mixture acceptable to the property owner or public authority having jurisdiction.

10. The Contractor agrees to answer all customer restoration complaints immediately upon receiving notice from the Purchaser.

11. All final soft restoration, seed and straw, shall be included in the length of main installed. Twelve (12) inches of topsoil will be required if granular material is used as a backfill. The Contractor shall be required to hydro-seed all soft areas, except when

Duke Energy or a governing agency Inspector instructs the contractor to seed and straw based on weather conditions. Topsoil is a separate bid item.

12. Pavement marking restoration will be required after performing the hard surface restoration unless otherwise specified by the Duke Energy.

13. Traffic loop restoration shall be the responsibility of the contractor.

14. Curb ramps may be required at the intersections of streets.

15. All tie-in areas shall have permanent restoration placed within 5 days of tie-in completion if weather and governing agency allow.

16. All final restoration of longitudinal cuts shall be rolled even if grind and pave is a requirement of the permit. Duke Energy will require all uneven restorations to be redone.

17. Grind and pave work required by permit will be done at Duke Energy's expense unless it is due to poor workmanship on the original trench restoration. In some cases, the permit required grind and pave work is waived by the permitting agency if the final restoration is considered adequately smooth.

18. When installing gas main in a brick paved street, the existing bricks shall be salvaged. Following gas main installation, the salvaged bricks must be weaved into the repair area; no straight line saw cutting of the pavement will be permitted.

19. Determination of the limits of CL 32 asphalt restoration shall be at the discretion of Duke Energy or the permitting agency.

20. The City of Covington has specific restoration requirements for brick streets. Refer to attached letter Appendix "9-A".

21. The City of Cincinnati has submitted a general guideline of their traffic control requirements and usage of LSM and concrete. Refer to attached notes in Appendix "9-B".

22. When pouring concrete over a multiple of days; specifically Class 33, (2) 1" diameter 12" long rebars will be inserted half way at the end of the pour each day in order to "secure" the beginning of the new pour.

APPENDIX "9 - A"

CITY OF COVINGTON RESTORATION ORDINANCE

CITY OF COVINGTON

638 MADISON AVENUE • COVINGTON, KENTUCKY 41011-2898

August 9, 2005

Cinergy
670 W. North Bend Road
Cincinnati, OH 45224

Re: City of Covington Restoration Ordinance

Based on the recent concerns expressed by Covington residents, neighborhood committees, and various public agencies regarding restoration of streets and sidewalks, I felt it necessary to provide all the utility organizations performing work within the City a copy of our restoration requirements. Enclosed is a copy of the pertinent sections of our Code of Ordinances specifically addressing restoration of streets, alleys, sidewalks, and other passageways within the City's right-of-way.

The recent concerns have been restoration of brick streets and alleys or the lack thereof. Due to the historical significance of this particular infrastructure I am asking that you remind your field crews and contractors of the detailed requirements for restoration of brick streets and alleys. The intent insofar as possible is to carefully remove the existing brick and replace the same after utility work is completed. In cases where this is not possible, I ask that you coordinate your efforts with the Engineering Department.

To assist in the planning process, I have enclosed a map highlighting the brick streets within Covington. We are hopeful that with proper coordination we can maintain the historical appeal we are known for in the state of Kentucky.

Thank you for your continued efforts in maintaining and improving our city.

Sincerely,

Thomas H. Logan, PE
City Engineer
City of Covington

c: Jay Fossett, City Manager

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§ 96.05 ENCROACHMENT PERMITS FOR WORK ON STREETS; REPAIRS TO STREETS.

(E) *Restoration regulations.*

(1) Each and every person who excavates, digs into, or occupies the right-of-way of any city street, alley, sidewalk, or other public way or any owner of real estate or the agent or lessee of such owner, who allows or permits such work to be done, whether under contract with the city or otherwise, has a duty, upon completion of such work, to immediately cause the street, alley, sidewalk, or other public way worked upon to be placed in reasonably close conformity to its condition before such work began. This work shall include, but not be limited to, the following:

(a) Installing, removing, or repairing any water pipe for the conveyance of water; gas pipe for the conveyance of gas; sewer pipe for the conveyance of drainage or sewerage; electric, telephone, computer, or cable type conduit of any kind; construction of any kind of sewer or other drain structure; or for the purpose of making house connections of any kind whatsoever;

(b) Installing, removing, or repairing any overhead lines or other similar facilities; and/or

(c) Opening, excavating, or occupying the right-of-way of any city street, alley, sidewalk or other public way or causing or permitting it to be opened, excavated, or occupied.

(2) Restoration work shall include the proper and thorough compacting and settling of the earth displaced, replacement of backfill, sub-base, or pavement, as required by current city standards or subdivision regulations. The top of any such opening shall be replaced or laid with the same or nearly the same kind of material(s) as composed the surface before such opening was made and in the same manner and upon the same level as it lay before such opening was made.

(a) If bricks or pavers are removed, to the extent possible, the removed bricks or pavers should be reused at the top of any such opening. If the removed bricks or pavers cannot be reused, then bricks or pavers of a like kind and material should be used. Restoration work must be completed immediately after the purpose for opening the street, alley, sidewalk, or public way is accomplished, and such work must be completed before the person or company doing the work leaves the work site, unless the City Engineer grants to said person or company a written extension of time to complete the restoration work. The street, alley, sidewalk, or other public way worked on, immediately after such work is done, shall be placed in reasonably close conformity to its original condition in every respect as it was before such work was commenced.

(b) The duty of restoring the street, alley, sidewalk, or other public way to conformity with its original condition is also imposed upon any contractor and any officer and upon any and all other persons under whose direction, supervision, or oversight such work is done or upon whose request, permission or cooperation such opening is made. It is the duty of the City Engineer to require and see that the provisions of this section are strictly, promptly, fully, and carefully carried out and enforced.

('77 Code, § 622.2, Sec. IV(a)) (Ord. O-16-82, passed 3-16-82; Am. Ord. O-17-02, passed 4-9-02) Penalty, see § 96.99


N
Legend
Brick Streets
Railroads
Covington Boundary
1 inch equals 1,300 feet

APPENDIX "9 - B"

CITY OF CINCINNATI NOTES

Pre-Construction Meeting

Inspection

Call 352-3451 every morning between 7:30AM & 8:30 AM with Permit Number.

No phone calls on cell phone for inspection.

All traffic control, excavations, backfill, temporary and permanent restoration must be inspected.

When field inspections are made a designated or responsible person must be on job site to take instructions.

Excavation and Restoration

Excavation – Pre-saw full-depth with wet diamond blade saw, brine from saw must be washed down so as not to be tracked by autos or pedestrians into business. Remove spoils every day, nothing left over night.

Backfill – CLSM required in all city streets, driveways, sidewalks and within 2 feet of the edge of the pavement. See approved Ham-Cin List for approved mixes.

CDF with concrete base restoration – must wait a minimum of 12 hours before pouring concrete

CDF with asphalt base restoration – must wait a minimum of 12 hours before placing asphalt

Flashfill ™ - must wait 1-4 hours before pouring concrete or asphalt base

Temporary Street Restoration – 3 options

1. 10" crushed stone or slag with a 2" cap of Hot Asphalt Mix #448
2. Bring CLSM within 2" of street and cap with 2" of Hot Asphalt Mix #448
3. Bring CLSM within 3" of street and cap with 3" of Concrete

Temporary Sidewalk Restoration – 2" of compacted Hot Asphalt Mix # 448

No Cold Mix will be allowed for any temporary restoration, street or sidewalk.

Final Street Restoration –

Concrete Base - 9" Class C Concrete with 2" cap of Hot Asphalt Mix #448. Main arterial roads require concrete to be pinned with #5 Epoxy Coated Rebar. Rebar or keyways will be required at the end of each concrete base pour.

Concrete

Standard Class C Concrete – minimum setup time 5-7 days
Class MS Concrete – minimum setup time 24 hours
Class FS Concrete – minimum setup time 4 hours

Internal Vibrator
Bull Float
Hand floats
Broom finish
String all castings for grade.

Asphalt

All asphalt restoration must be parallel and perpendicular to the Center line or curb line
Hot Asphalt Mix #448
Tack coat per ODOT 702.04
3 to 5 ton roller
Sealer per ODOT 705.04 (except in crosswalks)

Asphalt Base

Arterial Road – 2-5" lifts of Asphalt Item 304 with a 2" cap of Asphalt Item 448
Residential – 2-4" lift of Asphalt Item 304 with a 2" cap of Asphalt Item 448

All Brick surface streets must be restored in kind.

Final Sidewalk and Driveway Restoration – 5" Class C Concrete for sidewalks and 7" Class C Concrete for driveways.

Any excavation through a curb ramp will require complete replacement of the curb ramp and upgraded to meet current ADA requirements.

Maintenance of Traffic

Follow all rules for maintenance of traffic. Item 614 ODOT Traffic Safety Manual

Advance warning signs for traffic pattern.

Use of a uniformed police officer with cruiser may be required when working in or within 50' of a signalized intersection. Contact the Cincinnati Police Detail Unit at 352-2583 to coordinate.

No Parking Signs – Contact appropriate police district for policy and procedure

Some streets may have restricted working hours.

Miscellaneous

Street Plates – Plates will be required to be pinned, welded and ramped as necessary. No over night noise. Silence plates with expansion paper, tar paper or ramp plates. Also see attached memo from the City of Cincinnati dated 4/4/08.

Contact Urban Forestry at 861-9070 when working within 15' of a tree in the public right-of-way.

Special circumstances to be decided / directed by the City Engineer.

April 4, 2008

To all permit holders, Contractors, Utility Companies, Public Agencies with active excavations in City streets:

As the City of Cincinnati Traffic Road and Operations Division (TROD) prepares for the ongoing construction season, they will need to know the location of trench plates in City of Cincinnati streets during this season.

As a general rule we encourage everyone to make every attempt to complete permanent restoration of your trenches as soon as possible. If this can't be done we request that you use a temporary restoration acceptable to the Department of Transportation & Engineering Inspector assigned to your work.

Trench plates in City streets, during the construction season, should only be used for emergency purposes or when materials are not available to complete a good temporary pavement restoration.

We also request that all privately owned trench plates have permanent visible markings, such as the initials, of the company placed on the plates to better help identify which utility contractor the plates belong to.

Please advise ALL private contractors under your control and all necessary agency staff to contact TROD regularly with updated utility plate locations, the date placed, what utility it is for, and an emergency contact. Also, please remind them to call back when the plates are removed. You can contact TROD (Customer Service) at (513) 591-6000, 24 hours each day, 7 days a week.

This request is effective throughout the year, not just during snow plowing operations through the winter.

Your cooperation in providing this information to staff and attention to completing your street restorations are appreciated and will help to contribute to a safe and effective construction season.

Mike Niswonger
ROW Management Section
Transportation & Engineering
City of Cincinnati
(513) 352-3463

Section 10
Testing

A. Internal Cleaning Prior to Testing

1. The Contractor shall furnish labor, equipment, and pigs suitable for traversing all bends, for cleaning the interior of all pipes prior to the air test.

2. Under no circumstances will any water removal equipment (pigs) be allowed to remain in the line. The Contractor shall be billed for all costs associated for the removal of any equipment left in the line.

B. Testing Main

After installation, the Contractor shall furnish the labor and equipment to test the main, in accordance with the following procedure:

1. Testing Distribution Mains Operating **Less** Than 60 PSIG:

   a. The Purchaser will visually inspect all welds on steel mains. The Purchaser will, at his/her option, inspect the welds by radiographic methods or by destructive testing methods. The Contractor shall conduct his/her work in a manner that permits the Purchaser and/or Radiographer to obtain a satisfactory examination of the pipeline. Welds found to be defective shall be replaced by the Contractor at his/her expense.

   b. The Purchaser will inspect the heat fusion process used to join plastic pipe, connections, and fittings. Any joint connection or fitting that is visibly inspected and found to be defective or for any other reason believed not to be satisfactorily installed will be removed for testing. Joints found to be defective shall be replaced by the Contractor at his/her expense.

   c. The Contractor must complete the air test on the new main at least two (2) working days from the date of completing the installation.

   d. The Contractor shall furnish labor and equipment, including the calibrated pressure-recorder and charts, to successfully leak test all piping with air at 90-100 psig. The maximum pressure of the pressure chart shall not exceed 200 psig and must be equal to or greater than 8" in diameter. See Appendix 10-A "Acceptable and Unacceptable Test Charts"

   e. The duration of the leak test shall be at least 24 hours or as indicated on the "issued set" of plans.

   f. Pressure testing of plastic will not be initiated until all fusion joints have cooled to below 100 deg. F.

   g. Air compressors used for pressure testing shall be equipped with traps or filters on the discharge side to minimize the amount of oil contamination introduced to the

system. On plastic main jobs, the air compressors shall be equipped with an after-cooler capable of limiting the outlet air temperature to maximum allowable temperature of 100 deg. F.

h. While conducting pressure tests, every reasonable precaution must be taken to protect personnel and the general public during the test.

i. The Contractor shall locate and repair all leaks at his/her expense. A successful retest after the repair will be required. Re-pigging the line may be required if water is suspected of entering the line.

2. Testing Mains Operating Greater Than 60 PSIG:

a. The Purchaser will visually inspect all welds and specify the minimum percentage of welds to be radio-graphed. *{Gas Std. 6.2* Inspection of Pipeline Welding}

b. The Contractor must defer the installation of line valves until after the strength test has been successfully completed unless specified by the Purchaser.

c. After the line has been properly cleaned, the Contractor shall be required to furnish labor, tools, hydrostatic testing equipment, certified dead weight tester, and certified pressure chart recorder. Clean water is required to hydrostatically strength test the line to a pressure listed on the cover sheet of the "Issued Drawing". The pipe section being tested must have the test equipment located at the highest elevation in that section.

d. The hydrostatic test must not include any portion of the live main, service tees, etc. Testing is not permitted in these areas so as to prevent the possibility of introducing water into the system and to maintain the integrity of the existing main. The maximum pressure at any point in the test section shall not exceed 100% SMYS unless specified by Engineering. The duration of the strength test shall be no less than the time listed on the cover sheet of the "Issued Drawing".

e. After the completion of a successful strength test, the Contractor must supply suitable equipment and labor for removal of all water from the line. All water used for strength testing the main must be disposed of per that State's environmental guidelines.

f. After the completion of the strength test and before the air test, the Contractor shall install the valves, valve connections, blow-offs and other accessories as specified on the Purchaser's "Issued Drawings".

g. In the event others perform the hydrostatic test, the Contractor shall be required to prepare the line for testing, including the attachment and removal of end closures and other testing appurtenances.

h. The Contractor shall furnish the labor and equipment, including the calibrated pressure-recorder and charts, to successfully leak test all piping with air at 90-100 psig. The maximum pressure of the pressure chart shall not exceed 200 psig and have a diameter greater than or equal to 8".

i. The duration of the leak test shall be at least 24 hours or as indicated on the "Issued Set" of plans. The Contractor shall locate and repair all leaks at his/her expense. A successful leak test will be required after all leaks have been repaired.

C. Purging

1. In most cases, the Purchaser will purge the air from the completed installation. In some cases, the Contractor may be required to purge the air from the completed installations. In those cases, the Contractor shall furnish labor and certified purging equipment (exclusive of the purging medium) to purge the main in a manner approved and supervised by the Purchaser.

2. An inert gas, supplied by the Purchaser, shall be admitted to one end of the main and vented from the other end. The quantity of inert gas will be determined by the Purchaser.

3. The vent pipe shall extend a sufficient distance above ground level and shall be equipped with a conveniently located sampling connection.

4. The Purchaser may prescribe complete screening of the vent pipe with nonferrous material having a total area of at least 15 times that of the open end of the vent pipe. The screening material shall have a maximum screen size of 50 mesh. The vent pipe shall be grounded using #12 or larger copper wire, fastened securely to a metallic rod driven into moist earth. All purging shall be done while the new installation is physically isolated from gas lines in service. Immediately after purging has been completed, the main will be tied into the gas distribution system by the Purchaser. After adequate purging, as determined by the Purchaser, the line will be pressurized with natural gas by the Purchaser.

D. Test Equipment

1. All test gages/recorders and dead weight testers shall be supplied by the Contractor.

2. The gages/recorders listed above must have been calibrated within one year's time before being used to perform any tests. All calibration records must be traceable to the National Bureau of Weights and Measures. The original calibration sheet or copy must be submitted to Gas Engineering for documentation purposes prior to use in field.

3. The dead weight testers must be in good condition. The piston must move freely in the vertical direction and also rotate freely.

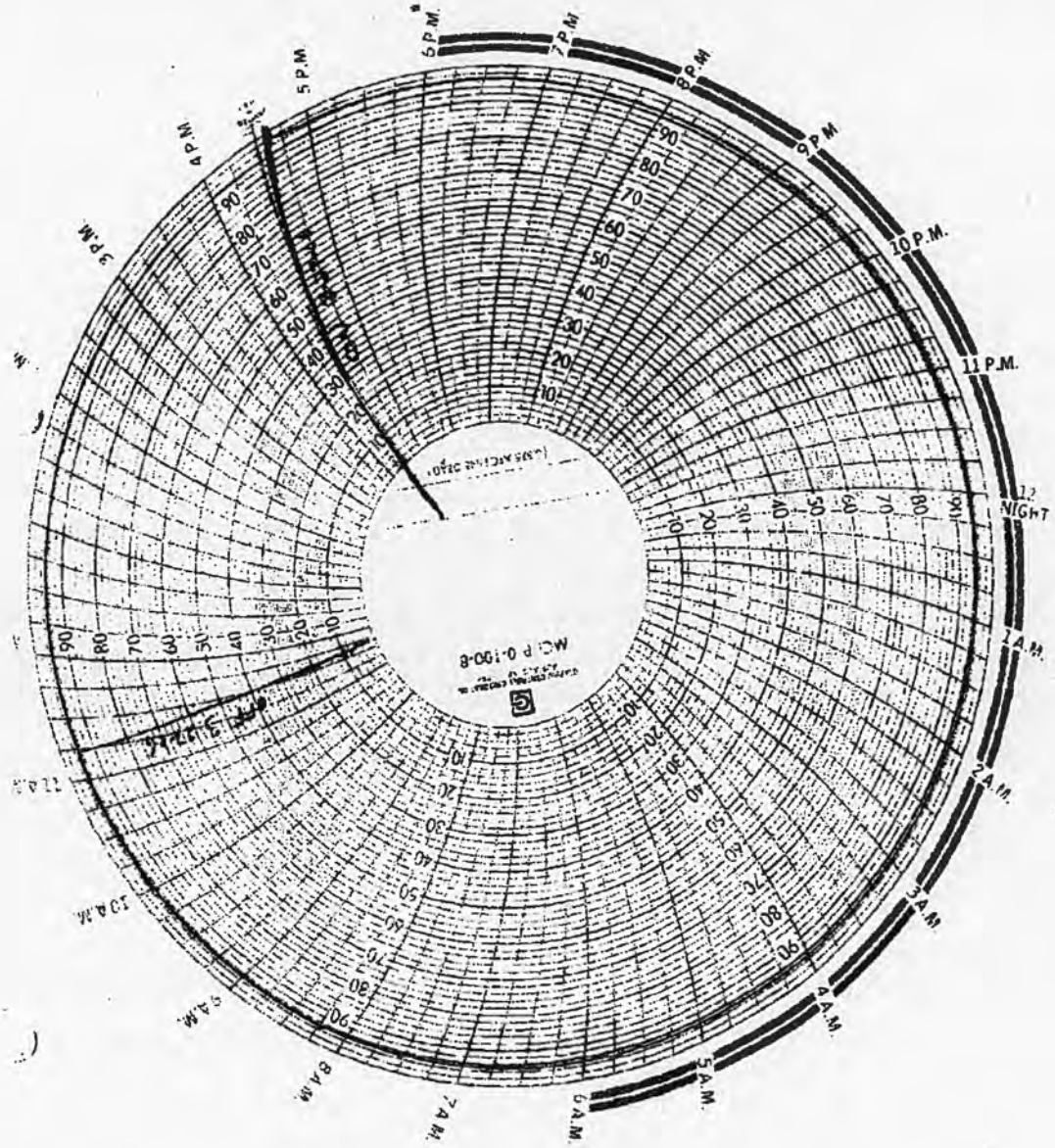
4. The charts used on pressure chart recorder must have a maximum pressure listing of no more than twice the maximum pressure of the hydrostatic test. E.g., maximum pressure for the hydrostatic test is 800 psig; the maximum pressure listed on the chart must be 1600 psig or less.

5. The diameter of the charts used on the chart recorders must be 8" or larger.

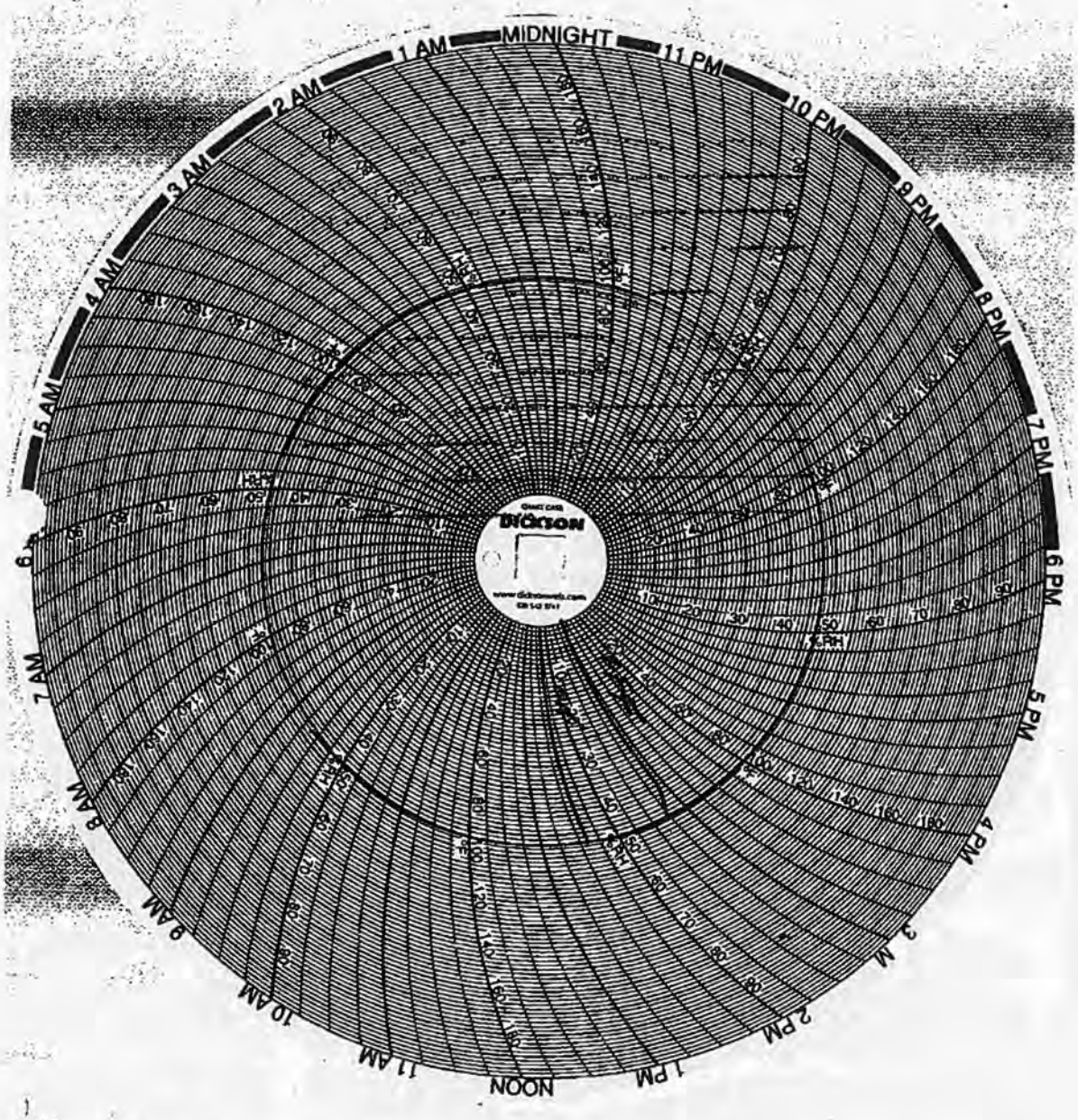
APPENDIX "10 - A"

ACCEPTABLE AND UNACCEPTABLE TEST CHARTS

ACCEPTABLE CHART



UNACCEPTABLE CHART



Section 11

Sewer Location and Breech Prevention

A. Safety

1. Duke Energy requires all pipeline Contractors to video inspect all sewers and drain lines located within the limits of any horizontal directionally drilled service and/or gas main after installation.

2. All Work performed must comply with OSHA Confined Space Regulations.

3. Proper traffic control is required, based on the permitting agency where Work is to take place. The contractor must notify MSD on a daily basis of what they intend to do that day. Duke Energy will handle the acquisition of the necessary permits to perform the Work.

4. All Sewer Districts must be notified at least 24 hours prior to entering their facilities.

B. Sewer Video

1. Designated main sewer lines and sewer laterals shall be inspected by means of a remote Closed Circuit Television (CCTV) system. A "general flush" cleaning shall be included in the normal pre/post camera inspection. If a blockage in the sewer/drain line cannot be removed by performing the "general flush" and is found to impede the progress of the video recording, then the contractor shall attempt to complete that section by televising from the next manhole, or other access, in the opposite direction to complete this section. The reversal in the camera's direction must immediately follow the previously impeded direction of the inspection. An audio explanation must accompany this portion of the video.

2. All sewer laterals must be accounted for when directional drilling main and/or services on a particular street. In a situation where it is believed that the laterals exit the rear (opposite of street side) of the building, a pre-locate will be required in order to verify all tap locations. This video inspection shall be recorded on a DVD and be submitted to Duke Energy. If a lateral location cannot be verified using a main line sewer camera for a particular address, then the Contractor shall access the inside of the property to use a "push camera" in the lateral exiting the property to determine its exact location.

3. All sewer video work performed within the service territory of the Cincinnati Metropolitan Sewer District (CMSD) shall be done in accordance with the "Sewer Main, Lateral and Drain Line Video Recording within Cincinnati Metropolitan Sewer District Service Area" specification. The video contractor shall be responsible to get the necessary training from CMSD to perform this work.

4. It will be necessary for the camera view to be centered within the sewer pipe in order to provide an accurate measurement of important physical features located inside the sewer. These measurements shall be displayed and documented on the DVD. All video must provide accurate measurements from manhole to manhole and the

manholes should indicate either the street address or intersecting streets. Pipes larger than 40" in diameter may require an actual entry into the pipe to record the information. The limits of the trunk line video must be within the extreme limits of the estimated property lines of the last house where the gas main was installed.

C. Recorded Data (DVD)

1. A sketch of the trunk line must accompany each DVD. Each tap must be shown on the sketch. The sketch must be in a readily available electronic format. The sketch must be recorded on the appropriate DVD in a legible fashion.

2. Individual sewer laterals must be inspected at a minimum from the trunk line to the foundation of the house. If it is not possible to inspect the lateral from the trunk line and there is no clean out to be found, then it will be necessary to inspect the lateral from the roof vent. If it is found that there is no possible way to video the lateral, a waiver must be utilized.

3. The CCTV inspections will be conducted entirely in a digital format. Two (2) properly marked DVD copies will be sent to the Duke Representative within two (2) weeks after the completion of the job.

4. The following information must be "Hand Written Legibly" on the surface of each submitted DVD. See Appendix "11-A" for required DVD labeling.

    a. Job Number
    b. Contractor Performing Work
    c. Name of Municipality
    d. Street/Streets' Name
    e. Address Range - list all addresses and label them M-C or C-M

5. The following guidelines must be adhered to so as to facilitate retrieval of sewer information in the future:

    a. The submitted DVD's must be recorded in a format that the software program "WIN DVD" can view. Other formats may be allowed after a Duke review and approval.
    b. No more than one job is to be placed on each set of disks
    c. Each set of DVD's shall have no more than one city block's worth of information recorded
    d. A paragraph describing the Work done and the location must be included on each disk as a .PDF file
    e. A sketch depicting the trunk line and laterals must be included on each disk as a readily available electronic format.
    f. Each disk must be able to be copied
    g. It shall be the recording Contractor's responsibility to provide properly recorded DVD's with the correct documentation on the DVD. If it is found that the DVD's

supplied are not able to be read or missing the above requirements, a new recording will be required at no additional cost to Duke.

6. If a job requires more than one disk, the disks must be marked as a set, e.g. Disk 1 of 2, etc. Each DVD must still include all pertinent information as listed above.

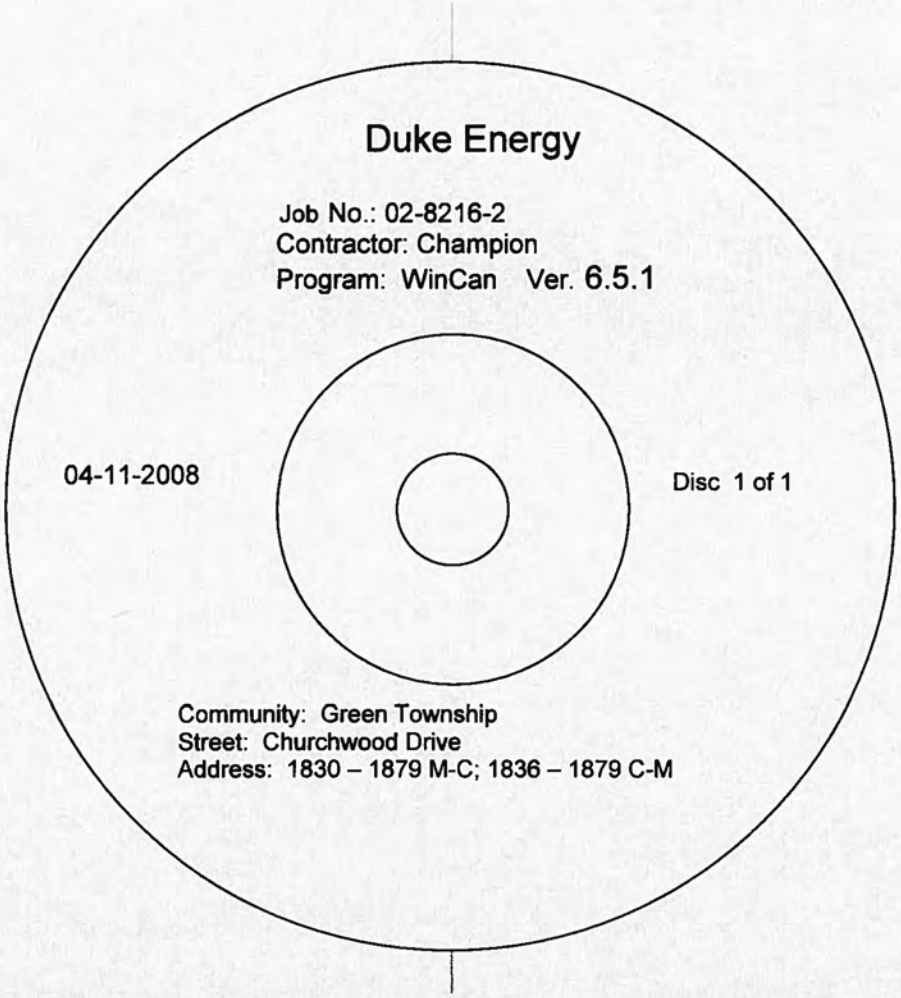
D. Breech Located

1. If a breach due to a gas facility installation by the Gas Contractor is encountered in a sewer main, lateral or drain line, then the Gas Contractor must respond immediately to the site of the breach and video camera all sewer mains, laterals and drain lines within a measured distance of 500 feet in each direction from the location of the breach . If an additional breach is located, an additional measured 500 feet of camera work will be required from the last measured location. See Appendix "11-B".

2. The Northern Kentucky Sanitation District and the Metropolitan Sewer District have requested that they be contacted when their facilities are damaged. Refer to attached letter in Appendix "11-C".

APPENDIX "11 - A"

REQUIRED SEWER VIDEO DVD LABELING FORMAT



1) Font is to be Arial size 10, except for the Duke Energy heading which is Arial size 14
2) Layout is to be as shown in the above diagram, any deviation needs prior written approval for its use.
3) All information shown is to be provided on the disc
    a. Heading – Duke Energy
    b. Job No.: Duke Energy Job Number; Only 1 job per set of discs
    c. Contractor: Contractor who performed videoing of sewer lines
    d. Program: Video program including version used by contractor
    e. Date: Date post camera video of Street is completed
    f. Disc _ of _ - Number of disc and number of disc(s) in set
    g. Community: Community as stated in the contract documents
    h. Street: The street shown on disc; No more than 1 block of information per disc
    i. Address: Street address range shown on the disc
4) All information is to be "Light Scribed" onto the disc

In addition to the video each disc shall contain:

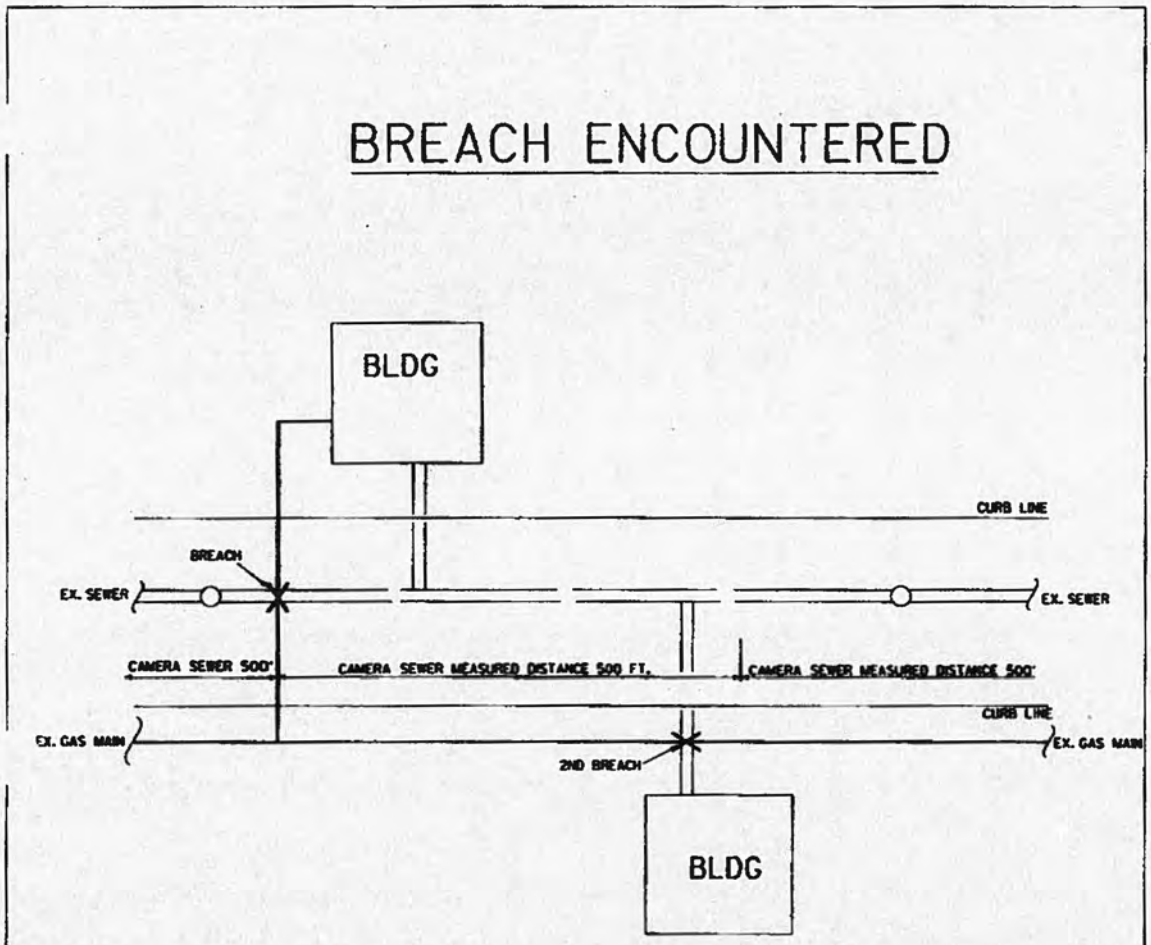
1) Description of the work performed and the location as a PDF file.
2) A sketch depicting the trunk line and laterals as a PDF file or Excel Spreadsheet.

DVD's must be recorded in a format so that the program can be operated on Duke Energy's computers.

It is the contractor's responsibility to provide properly recorded DVD's with the correct documentation on the DVD. If, it is found the DVD's supplied are not able to be read or missing the above requirements, a new disc will be furnished at no cost to Duke Energy that is readable and meets all of the above requirements.

APPENDIX "11 - B"

CAMERA GUIDELINES IF A BREACH IS ENCOUNTERED



1) IF A BREACH IS FOUND A DISTANCE OF 500 FT. IN EACH DIRECT MUST BE RE-CAMERA. THIS INCLUDES SEWER MAINS (SANITARY AND STORM). ALL SEWER LATERALS AND DOWN SPOUTS.

2) IFA 2ND BREACH IS FOUND WITHIN THAT 1000 FT RE-CAMERA DISTANCE, AN ADDITIONAL 500 FT. MUST BE RE-CAMERA STARTING FROM THE END OF THE ORIGINAL MEASUREMENT AT THE CONTRACTOR'S EXPENSE

APPENDIX "11 - C"

SANITATION DISTRICT CONTACT INFORMATION

SANITATION DISTRICT NO. 1

June 15, 2004

Ms. Rhonda Whitaker
Area Manager
Cinergy, ULH&P
107 Brent Spence Square
Covington, KY 41011

Dear Rhonda:

We understand that Cinergy is currently in the process of completing upgrades to gas systems throughout much of Northern Kentucky. While this work was being completed in the City of Southgate, crews damaged a sanitary sewer line on Willow Road near US 27. Gas crews made a repair to the sanitary line but unfortunately it was done improperly.

In the future, if a sanitary sewer line is damaged during a repair, we ask that you contact our Dispatch immediately at 859-578-7466. This will help us to ensure that proper materials and procedures are used to complete the repairs. We ask that if one of your crews completes the repair, that we be notified so that an inspection can be completed prior to the repair being backfilled. If it is more convenient for you, Sanitation District crews can complete the repairs and invoice you for the costs of the repair including time and material.

If you have any questions regarding this matter, please do not hesitate to contact John Penick, Director of Collection Systems, at 859-578-7455.

Sincerely,

Jeffery A. Tiger
General Manager

1045 Eaton Drive • Ft. Wright, Kentucky 41017-9681 • Ph: (859) 578-7450 • Fax: (859) 331-2436

Metropolitan Sewer District (MSD) Repair Request

MSD/Collections needs to be informed of any repairs to one of their sewers so that they can inspect the repair and do not schedule one of their crews to make the repair. MSD/WWC should be contacted at 513-352-4900 when a sewer repair is scheduled. They will send one of their inspectors to the job site to approve the repair. This should save time and money for both MSD and Duke Energy by decreasing the number of failed repairs and double scheduling.

Section 12

Procedure Listing

Section 12: Procedure Listing

The following list is a recommended listing of procedures developed for use in Duke Energy for the typical gas construction project. This list is not all inclusive but contains those procedures most likely required for use in the field during the installation of gas mains and services along withsimilar related activities.

The actual procedures can be found on the "Gas Operation's Home Page" located on the portal. If you are unable to get this information, notify the Sponsor Engineer and request a copy of the procedure be sent to you.

Procedure Number	Procedure Title
GD02.116	Customer Notification – Customer Owned Service Lines
GD02.1209-8	Operations And Testing Valves
GD02.1212-4	Damage Prevention Program
GD02.1212-8	Gas Facility Location
GD02.901.2	Corrosion Control
GD02.902.1	General Policy for Corrosion Control
GD02.903.1	Corrosion Control Plan
GD02.903.2	Pipeline Coating Specification
GD02.904.3	Wire Connections to Pipelines
GD10.01	Uprating of Steel Piping Systems
GD10.1003-1	Hydrostatic Strength Testing of Mains
GD10.1003-5	Air Test Leaks
GD10.1203	Medium Pressure – MAOP and MOP
GD10.1211-1	Purge Calculations
GD10.1214	Procedures For Digging and Surveying Test Holes for Locating Buried Gas Main
GD10.225	Design of Material and Pipeline Components
GD10.302	Lowering In-Service Steel Pipelines
GD10.302-2	Design of Steel Piping Systems
GD150	Installation of Gas Mains and Services
GD20.463	Magnesium Anodes
GD210	Materials Specifcation for Plant Applied Coating Material for Carbon Steel Pipe
GD215	Plastic Pipe and Fitting Specification
GD40.01-01	Gas Main - Tracking & Recording Tie-In, Separation & Abandonment Of Gas Mains
GD40.01-02	Gas Main - Standard Pressure - Tie-In, Separation & Abandonment
GD40.1103	Conversion/Uprating/Pressure Increasing Guidelines
GD50.0001	Control of Hazardous Energy (Lockout/Tagout)
GD50.0002	Control Of Hazardous Energy (Lockout / Tagout)
GD55.1210	Planned and Unplanned Interruption of Service
GD55.1220-1	Locating & Temporary Marking of Natural Gas Facilities

Section 12: Procedure Listing

Procedure Number	Procedure Title
GD55.1303-1	General Policy for Pipeline Markers
GD55.1304-2	Inside Leak Detection Procedure
GD55.500	Visual and Radiographic Weld Inspection on Steel Pipelines
GD55.505-1	Welding Qualifications
GD55.512-1	Limitations of Welders and Welding Processes
GD60.078	Annual Qualification For Joining Plastic Pipe By Qualified Personnel
GD60.111	Prevention of Accidental Ignition
GD60.122	Supplied Breathing Air
GD60.130	Gas Vault/Pit Entry
GD60.162	Leak and Strength Testing of Short Segments of Pipe used for Tie-ins and Main Repairs
GD60.200	Work Zone Safety
GD60.2001	Gas Pipeline Condensate Management
GD60.2002	Mercury Regulator Handling, Spill Response and Clean-Up
GD60.250	Materials Handling And Storage Of Polyethylene Pipe And Fittings
GD60.383	Excess Flow Valve Installation
GD60.434	Tapping and Squeeze-off of Polyethylene Gas Mains under Pressure
GD60.444	Procedure For Excavation Safety
GD60.444 Supplement	Directional Drill Requirement for Locating Underground Utilities
GD60.462	Applying Wax Tape Coatings for Below Ground Applications
GD60.465.1	Insulphone Tester
GD60.465.2	Cathodic Protection Indicator
GD60.465.3	Continuity Tester
GD60.625	Service Delivery Training, Meter, Regulator Installations
GD60.631	Testing & Inspecting Residential Customer House Lines
GD60.632	Testing Inspecting Commercial and Industrial Houselines
GD60.633	Meter Testing Customer House Lines for Leaks
GD60.636	Customer Meters: Turning Gas On to a New Meter Set
GD60.637	Customer Meters: Turning Gas On (Reconnect or Succession) For A New Customer
GD60.658	Periodic Meter Changes (Age Changes)
GD60.700	Gas Service Renewal
GD60.701	New Gas Service Installation
GD60.702	Curb Box and Valve Box Accessibility Program
GD60.704	Flexible Service Riser Replacement
GD60.719	Joining Copper by High Temperature Soldering
GD60.720	Corrosion - Causes And Prevention
GD60.728	Tapping and Stoppling of Metallic Gas Mains Under Pressure
GD60.730	Main Tie-ins, Cut Outs and Isolation of Main Segments

Section 12: Procedure Listing

Procedure Number	Procedure Title
GD60.730	Main Tie-ins, Cut Outs and Isolation of Main Segments
GD60.732	Grounding and Temporary Bonding of Pipelines
GD60.738	Weld Inspection - Visual
GD60.739	Xray Report - Daily Completion
GD60.751	Repair of Distribution Mains
GD60.752	Permanent Repairs on Transmission and Feeder Lines
GD60.776	Joining Polyethylene Piping Systems by Butt Fusion Utilizing the 14 Machine
GD60.779	Joining Polyethylene Piping Systems By Electrofusion
GD60.780	Joining Pipe With Mechanical Fittings
GD60.782	Joining PE2406 Polyethylene Pipe By Butt Fusion Utilizing The Mcelroy No. 28 Fusion Unit
GD60.782-1	Joining Polyethylene Pipe by Butt Fusion with Mcelroy no. 412 High Velocity Fusion Unit
GD60.783	Repair of Aldyl A Service Punch Tee (SPT) and Tapping Tee
GD60.785	Abandonment or Inactivation of Facilities